University of Maryland at College Park

Undergraduate Catalog 1973-74

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CAMPUS REORGANIZATION

On March 8, 1972, a new Campus organization was approved for the College Park Campus.

As this edition of the *Catalog* goes to press, transition to the new organization is in progress. This transition is reflected in the sections dealing with general information, descriptions of the academic divisions of the Campus, the departments, the course listings and the faculty. In a transition period a book such as this one cannot reflect thoroughly the progress of all changes. *You can, however, use this book as a starting point in planning your work and can then check with your advisor.*

The Editors

COLLEGE PARK

The five divisions and their component Colleges, Schools, Departments, Programs, and Institutes, as they are interpreted at this time, are outlined here.

Division of Arts and Humanities

School of Architecture

College of Journalism

American Studies Program
Art
Classic Languages and Literatures
Dance
English Language and Literature; Comparative Literature
French & Italian Languages and Literatures
German and Slavic Languages and Literatures
History
Music
Oriental and Semitic Program
Philosophy
Spanish & Portuguese Languages and Literatures
Speech & Dramatic Art

Division of Behavioral and Social Sciences

College of Business & Management

Afro-American Studies Program
Anthropology Program
Bureau of Business and Economic Research
Bureau of Governmental Research
Economics
Geography
Government & Politics
Information Systems Management
Institute of Criminal Justice and Criminology
Institute of Urban Studies
Linguistics Program
Psychology
Sociology
(Speech & Hearing Science)

Division of Human and Community Resources

College of Education
- Administration Supervision & Curriculum
- Child Study
- Counseling & Personnel Services
- Early Childhood Elementary Education
- Industrial Education
- Measurement & Statistics
- Secondary Education
- Special Education

College of Human Ecology
- Family and Community Development
- Foods, Nutrition & Institution Administration
- Housing & Applied Design
- Textiles & Consumer Economics

College of Library and Information Services

College of Physical Education
- Health Education
- Physical Education
- Recreation

Division of Life Sciences and Agriculture

College of Agriculture
- Agronomy
- Agricultural Engineering
- Agricultural & Extension Education
- Agricultural & Resource Economics
- Animal Science
- Dairy Science
- Horticulture
- Poultry Science
- Veterinary Science

Botany
Chemistry
Entomology
(Geology)
Microbiology
Natural Resources Institute
Zoology

Division of Mathematical, Physical and Engineering Sciences

College of Engineering
- Aero-space
- Chemical
- Civil
- Electrical
- Fire Protection
- Mechanical

Applied Mathematics Program
Center for Materials Research
Computer Science
Institute for Fluid Dynamics & Applied Mathematics
Institute for Molecular Physics
Mathematics
Physics & Astronomy

UNIVERSITY OF MARYLAND
AT COLLEGE PARK
UNDERGRADUATE
CATALOG
1973-74

The provisions of this publication are not to be regarded as an irrevocable contract between the student and the University of Maryland. Changes are effected from time to time in the general regulations and in the academic requirements. There are established procedures for making changes, procedures which protect the institution's integrity and the individual student's interest and welfare. A curriculum or graduation requirement, when altered, is not made retroactive unless the alteration is to the student's advantage and can be accommodated within the span of years normally required for graduation. When the actions of a student are judged by competent authority, using established procedure, to be detrimental to the interests of the University community, that person may be required to withdraw from the University.

The University of Maryland, in all its branches and divisions, subscribes to a policy of equal educational and employment opportunity for people of every race, creed, ethnic origin and sex.

College Park Publications Office
POJ 672-817

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CHANCELLOR'S MESSAGE

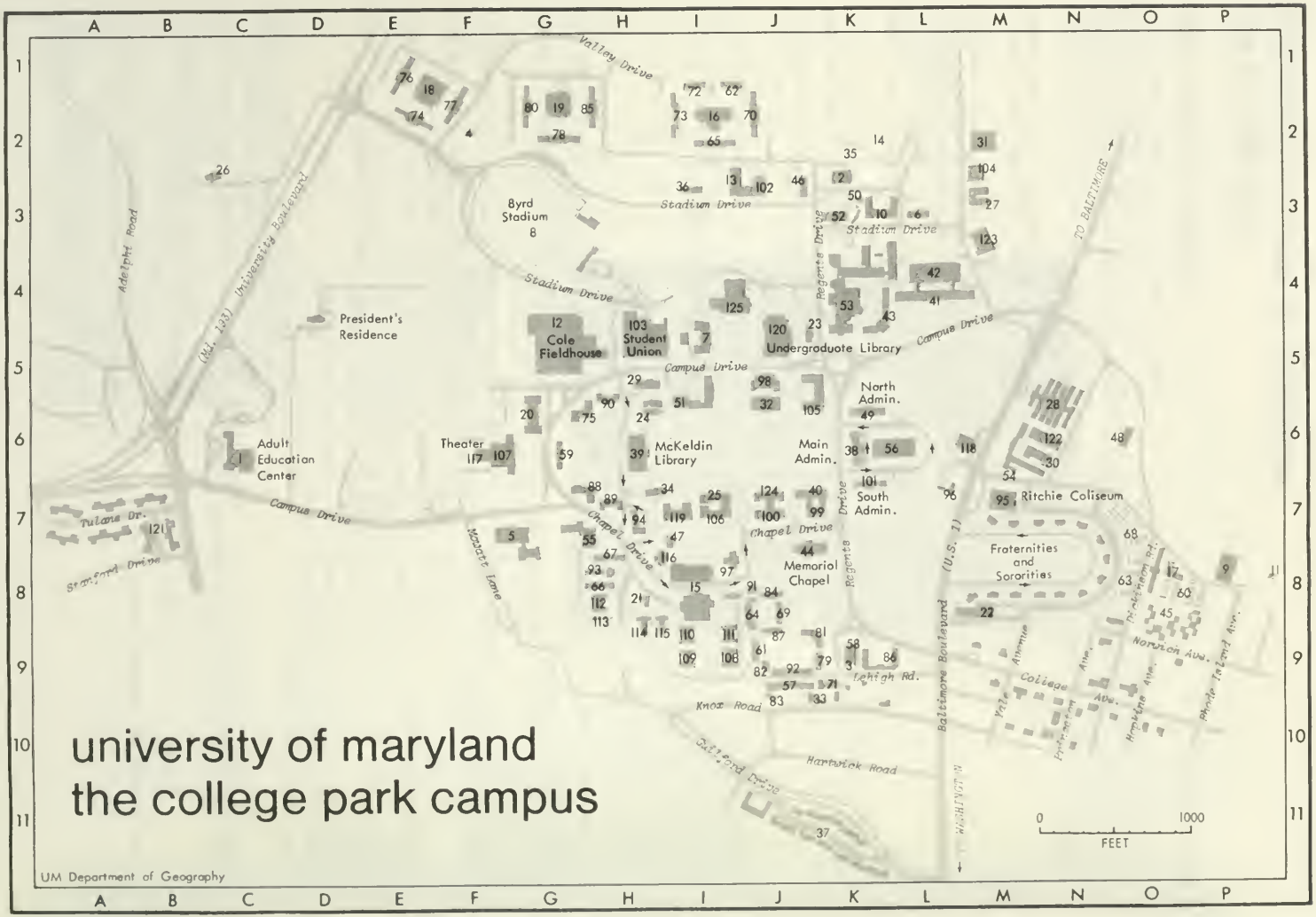
A spirit of scholarly growth and intellectual achievement characterizes the University of Maryland at College Park. The classrooms, laboratories and the community offer creative and satisfying educational experiences. The wide range of educational opportunities assures the flexibility needed to develop a program consistent with the interests and academic potential of each individual. I am confident that your stay on the Campus will provide you with an exciting adventure in learning.

C. E. Bishop

Chancellor, College Park Campus

UNIVERSITY OF MARYLAND CATALOGS AVAILABLE TO YOU

CATALOGS	WHERE TO GET THEM
1. *Undergraduate* The Undergraduate Catalog for College Park 1973-74 (this book) is for students and faculty at College Park, for high school counselors in the State, for public libraries in the State and for colleges and universities around the country. This book is an internal document, not a free offering to the public.	*Students at College Park* will be able to secure a free copy in March 1973, in the new Undergraduate Library. An announcement about the arrival time will appear in the *Diamondback*. Students are urged to pick up a copy in good time. Last year 25,000 copies were picked up in three weeks. All 50,000 copies were in circulation within two months of delivery. *Applicants for Admission*. Copies of the *Catalog* are sent by mail to all students who confirm their intention to enroll. *The Inquiring Public*. A special booklet has been prepared for high school students in Maryland, for prospective students and for the public about the College Park Campus, called *Prospectus*. A copy of *Prospectus* may be obtained by sending a self-addressed, self-adhesive label to Catalog Mailing, 4910 Calvert Road, College Park, Maryland 20740.
2. *Summer Sessions Catalog*	A. In Person—Summer Sessions Office, 2nd floor, Turner Laboratory, University of Maryland, College, Park, Maryland 20742. B. By Mail—Summer Sessions, University of Maryland, College Park, Maryland 20742. C. By Phone: 454-3347.
3. *Graduate Bulletin* This book will soon be replaced by the new *Graduate Catalog* for College Park. See below. *Graduate Catalog: College Park* This book which is intended to take the place of the *Graduate Bulletin* will contain not only the information presently contained in the *Bulletin*, but also course information and faculty listings. Hopefully this book will appear in the fall of 1973.	A. In Person—2nd floor, South Administration Building, College Park Campus. B. By Mail—The Graduate Office, University of Maryland, College Park, Maryland 20742.
4. *Graduate School Catalog:* University-wide Similar to the *Graduate Catalog* College Park but including information about other University campuses.	A. In Person—Graduate Admissions Office, Room 205, South Administration Building, College Park Campus. B. By Mail—Graduate Registrations, University of Maryland, College Park, Maryland 20742.
5. *University College Campus Catalog* (Programs, courses, faculty)	A. In Person—Dean's Office, 2nd floor, Center of Adult Education, College Park Campus. B. By Mail—Registrations, University College, University of Maryland, College Park, Maryland 20742.
6. *Professional Schools of:* Dentistry Law Medicine Nursing Pharmacy Social Work and Community Planning	A. In Person—at the respective schools on the Baltimore Campus. B. By Mail—Dean's Office at the respective schools, University of Maryland, Baltimore, Maryland 21201.
7. *Eastern Shore Campus Catalog*	A. In Person—Admissions Office, Eastern Shore Campus B. By Mail—Admissions, University of Maryland, Eastern Shore Campus, Princess Anne, Maryland 21853.
8. *UMBC (Baltimore County Campus)* Areas of Study, courses, faculty	A. In Person—at the Admissions Office, Baltimore County Campus B. By Mail—Admissions and Registrations, UMBC, 5401 Wilkins Avenue, Baltimore, Maryland 21228. C. By Phone: (301) 455-2291.
9. *School of Library and Information Services Bulletin*	A. In Person—Admissions Office, School of Library and Information Services, New Undergraduate Library, College Park Campus. B. By Mail—Admissions Office, School of Library and Information Services, University of Maryland, College Park, Maryland 20742.


university of maryland
the college park campus
UM Department of Geography
Valley Drive
Adelphi Road
(Rt. 193) University Boulevard
President's Residence
8yrd Stadium
8
Stadium Drive
Regents Drive
TO BALTIMORE
12 Cole Fieldhouse
103 Student Union
Undergraduate Library
Campus Drive
North Admin.
Adult Education Center
Theater
McKeldin Library
Main Admin.
South Admin.
Ritchie Coliseum
Tulane Dr.
Stratford Drive
Chapel Drive
Mowatt Lane
Memorial Chapel
Fraternities and Sororities
Baltimore Boulevard (U.S. 1)
Lehigh Rd.
Knox Road
Hartwick Road
Sutherland Drive
College Ave.
Yale Avenue
Harvard Rd.
Princeton Ave.
Hopkins Ave.
Norwich Ave.
Penn State Ave.
0
1000
FEET

NO	BUILDING NAME	LOCATION
1.	Adult Education Center (BB)	C-6
2.	Animal Science Center (WW)	K-2
3.	Annapolis Hall	K-9
4.	Apiary (API)	F-2
5.	Architecture (ARC)	G-7
6.	Asphalt Institute	L-3
7.	Bureau of Mines, U.S.	I-5
8.	Byrd Stadium (STA)	G-3
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11.	Civil Defense Training	O-8
12.	Cole Fieldhouse (GG)	G-5
13.	Computer Science Center (MM)	L-3
14.	Dairy Barn (QQ)	K-2
15.	Dining Hall 1	I-8
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17.	Dining Hall 3	O-8
18.	Dining Hall 4	E-1
19.	Dining Hall 5	G-2
20.	Education (OO)	G-6
21.	Education Annex	H-8
22.	Fire Service (FS)	M-8
23.	Fish and Wildlife Service, U.S.	J-5
24.	Foreign Languages (LL)	H-6
25.	Francis Scott Key Hall (RR)	I-7
26.	Golf Course	C-2
27.	Grounds - Custodial Department	M-3
28.	Herrison Leb - Greenhause	N-6
29.	Health Center - Infirmary	H-5
30.	Heating Plant	N-6
31.	Heavy Research Lab	M-2
32.	Halzapfel Hall (F)	J-6
33.	Home Management Center (HMC)	K-10
Information: See Main Administration and Police Dept.		
34.	Journalism (G)	H-7
35.	Judging Pavilion (X)	K-2
36.	Jull Hell (II)	I-3
37.	Lard Calvert Apartments	J-11
38.	Main Administratian (IB)	K-6
39.	McKeldin Library (L) ✓	H-6
40.	Marie Mount Hall (H)	K-7
41.	Martin Engineering Classrooms (J)	L-4
42.	Martin Engineering Labs (S)	L-4
43.	Mathematics (Y)	K-4
44.	Memorial Chapel	K-7
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47.	Marrill Hall (M)	I-7
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NO.	BUILDING NAME	LOCATION
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64.	Colvert Hall	J-8
65.	Cambridge Hell (CAM)	I-2
66.	Caroline Hall	H-8
67.	Carroll Hall	H-8
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BUILDING CODE FOR USE WITH SCHEDULE OF CLASSES

A	Talioferro Hall
AA	Temporary Classrooms
API	Apiary
AR	Reckord Armory
ARC	Architecture
BB	Adult Education Center
IB	Main Administration
C	Chemistry
CAM	Cambridge Hall
CC	Temporary Classrooms
COL	Ritchie Coliseum
D	Dairy - Turner Lab
DD	Temporary Classrooms
E	H.J. Patterson Hall
EE	Temporary Classrooms
ELL	Ellicott Hall
F	Halzapfel Hall
FF	Temporary Classrooms
FS	Fire Service
G	Journalism
GG	Cole Fieldhouse
H	Marie Maunt Hall
HH	Temporary Classrooms
HMC	Home Management Center
I	Shriver Lab
II	Jull Hall
J	Martin Engineering Classrooms
JJ	Molecular Physics
K	Silvester Hall
KK	North Administration
L	McKeldin Library
LL	Foreign Languages
M	Morrill Hall
MM	Computer Science Center
N	Shoemaker Hall
NN	Towes Fine Arts Center
O	Symons Hall
OO	Education
P	J.M. Patterson Hall
Q	Tydings Hall - B.P.A.
QQ	Dairy Barn
R	Woods Hall
RR	Francis Scott Key Hall
S	Martin Engineering Labs
SS	Spoce Science Center
STA	Byrd Stadium
SU	Student Union
T	Skinner
TH	Terrapin Hall
TT	Temporary Classrooms
U	Chemical Engineering
UU	Temporary Classrooms
V	Wind Tunnel
VV	South Administration
W	Preinkert Fieldhouse
WW	Animal Science Center
X	Judging Pavilion
Y	Mathematics
Z	Physics
ZP	Zoology - Psychology

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Vice Chancellor for Academic Planning and Policy

JOHN W. DORSEY
Vice Chancellor for Administrative Affairs

CALENDAR FOR THE ACADEMIC YEAR 1973-74

1973 SUMMER SESSIONS

FIRST SUMMER SESSION, 1973:		
May 24, 25	Thursday, Friday	Registration
May 28	Monday	Memorial Day Holiday
May 29	Tuesday	Classes Begin
July 3	Tuesday	Last Day of Classes
SECOND SUMMER SESSION, 1973:		
July 5, 6	Thursday, Friday	Registration
July 9	Monday	Classes Begin
August 14	Tuesday	Last Day of Classes

1973-74 ACADEMIC YEAR

FALL SEMESTER, 1973:		
August 27-31	Monday-Friday	Registration
August 29	Wednesday	Classes Begin
September 3	Monday	Labor Day Holiday
November 21-23	Wednesday-Friday	Thanksgiving Recess
December 12	Wednesday	Last Day of Classes
December 13	Thursday	Exam Study Day
December 14-21	Friday-Friday	Fall Semester Examination Period
SPRING SEMESTER, 1974:		
January 7-11	Monday-Friday	Registration
January 9	Wednesday	Classes Begin
March 11-15	Monday-Friday	Spring Recess
May 1	Wednesday	Last Day of Classes
May 2	Thursday	Exam Study Day
May 3-10	Friday-Friday	Spring Semester Examination Period
May 12	Sunday, 3:00 P.M.	Graduation

SPECIAL ANNOUNCEMENT

THE GENERAL UNIVERSITY REQUIREMENTS

Just as this Catalog went to press the Board of Regents approved a major revision of the undergraduate requirements. What is known as "General Education Requirements," referred to in academic programs throughout this Catalog, is henceforth replaced by "General University Requirements," which are described on page 21.

Any student who entered the University prior to August, 1973, has the option of completing either the General Education Requirements, or the General University Requirements. Students first entering the University in August, 1973, or after must comply with the new General University Requirements.

THE UNIVERSITY

GOALS FOR COLLEGE PARK

Our objectives are simply stated: to enrich our students; to encourage them to develop those harmonious ideals and fine relationships which characterize cultured individuals; to provide an atmosphere for self-enlightenment in its widest sense, a complement to systematic learning in the arts, the humanities, the basic and applied sciences and the professional curricula; and to promote beneficial research and scholarship as a contribution to the welfare of the State, of the nation, and of the community of knowledge everywhere.

UNIVERSITIES IN GENERAL

The contemporary university is a comprehensive educational institution offering a multiplicity of undergraduate programs that are closely related to the graduate and professional programs.

Comprehensive universities as we know them in the United States have existed for less than a century, but their roots can be traced back to medieval history. The English college system served as the model for earliest American efforts at higher education. The ancient German university tradition was joined with this in the 1870's to form the basic outlines of our present institutions. Practical studies were grafted onto these more classically and theoretically oriented traditions by the agricultural emphasis of the land grant movement.

With the explosion of scientific and technological knowledge in the early twentieth century, the role of the university in American society attained increased importance, and today almost all aspects of national life—social, economic, scientific, and cultural—benefit from their educational, research and service functions.

COLLEGE PARK AND THE UNIVERSITY OF MARYLAND

The College Park Campus of the University was opened in 1859 as the Maryland Agricultural College under a charter secured by a group of Maryland planters. After a disastrous fire in 1912, the State acquired control of the College and bore the cost of rebuilding. In 1920 the State took over the faculty-owned University in Baltimore founded in 1807, merging it with the State-owned institution at College Park to form the present-day University of Maryland.

In 1886 the Delaware Conference Academy was founded by the Methodist Church in Princess Anne, Maryland. Title to the institution was acquired by the State of Maryland in 1926, and it became a division of the University of Maryland in 1948. It was made an integral part of the University system with the name, University of Maryland Eastern Shore (UMES), in 1970.

A new undergraduate branch campus known as University of Maryland Baltimore County (UMBC), was opened at Catonsville in 1966.

LIBRARIES AT COLLEGE PARK

The Theodore R. McKeldin Library is the general library of the University, containing reference works, periodicals, circulating books, and other materials in all fields of research and instruction. Branch libraries include the Undergraduate Library, the Engineering and Physical Sciences Library, the Architecture Library, and the Chemistry Library.

The libraries on the College Park Campus include approximately 1,200,000 volumes and 14,000 subscriptions to periodicals and newspapers, as well as many uncatalogued government documents, phonorecords, films and filmstrips, etc.

The Undergraduate Library, located just north of Campus Drive, seats approximately 4,000 readers and shelves up to 200,000 volumes. It is intended to meet most library needs of undergraduates. The McKeldin Library mainly supports the graduate and research programs of the University, but is also open to undergraduates.

Special collections in the library system include those of Richard Van Mises in mathematics and applied mechanics; Max Born in the physical sciences; Thomas I. Cook in political science; Romeo Mansueti in the biological sciences; Katherine Anne Porter; Maryland; U.S. government publications (for which the University is a regional depository); documents of the United Nations, the League of Nations, and other international organizations; agricultural experiment station and extension service publications; maps from the U.S. Army Map Service; the files of the Industrial Union of Marine and Shipbuilding Workers of America; the Wallenstein collection of musical scores; the André Kostelanetz Music Library; and research collections of the American Bandmasters Association, the National Association of Wind and Percussion Instructors and the Music Educators National Conference. In addition, the collections include microfilm productions of government documents, rare books, early journals, and newspapers.

Other Area Resources

The College Park Campus area is in a region rich in research collections. In the Washington area are the Library of Congress, the National Archives, the Folger Library, the National Library of Medicine, the National Agricultural Library, and various academic and special libraries. In the Baltimore area, in addition to the University's own libraries at UMBC and on the professional campus, are the Enoch Pratt Free Library and the Maryland Historical Association Library. The Maryland Hall of Records is located in Annapolis.

CAMPUS RESEARCH FACILITIES

The research programs at the University derive their existence and vigor from a faculty comprised of internationally recognized scholars and scientists. It is an advantage for undergraduate students to be aware of the University's research facilities as they plan their programs.

In addition to fine library resources and the usual laboratory facilities for undergraduate studies, the University has developed outstanding opportunities for research in the biological, physical, and social sciences. Among the exceptional facilities are the Institute for Child Study; the Natural Resources Institute; a Computer Science Center with a UNIVAC 1108, an IBM 7094, and two IBM 1401's; a laboratory for basic behavioral research on animals; a Center of Materials Research; Van de Graaff accelerators; a training nuclear reactor; a full-scale, low-velocity wind tunnel; a psycho-pharmacology laboratory; and laboratory models for meteorological phenomena. Collaborative arrangements with many nearby government agencies permit University students and faculty to utilize their research facilities. The University owns and operates the world's longest radio telescope, located in California. A 160 MeV cyclotron for research in nuclear studies is located on the College Park Campus.

Investigation in agriculture is an important aspect of University research. University farms total more than 2,000 acres. Breeding, selection in farm crops, and soil research are a part of the program. Work in these areas is augmented by X-ray equipment and an electron microscope.

SUMMER SESSIONS

Beginning in 1973, two six-week summer sessions will be held. The first session will run from from May 24 to July 3. The second session will run from July 5 to August 14. New freshmen students who have met the regular University admission requirements for fall enrollment may begin their studies during the summer rather than await August. The student who enters on this basis and who continues attending summer sessions can shorten his college career by up to a year, depending upon his curriculum and the progress he makes in it.

Courses offered during the summer are the same in content and in instruction as those offered during the fall and spring semesters. Many students have found the transition from secondary school to college facilitated by attending the summer session.

The Summer Cultural and Recreational Program is an important part of "Summer at Maryland." A Fine Arts Festival offers a series of programs in art, dance, drama, film and music, and outstanding performers in these media appear on the College Park Campus. Available to the student are facilities for swimming, tennis, bowling, etc., plus an intramural program in several team and individual sports.

For additional information write for a Summer Sessions Catalog, which may be obtained from the Administrative Dean for Summer Programs, College Park, Maryland 20742.

ADMISSION AND ORIENTATION

UNDERGRADUATE ADMISSION

The University of Maryland, in all its branches and divisions, subscribes to a policy of equal educational opportunity for all people regardless of race, sex, creed or ethnic origin.

FRESHMAN ADMISSION

General Requirements

Admission from secondary school is based on evidence indicating the applicant's probable success in the program of his choice.

All applicants must:

1. Meet academic requirements;
2. Be recommended for admission by their high school principal or counselor;
3. Have received their high school diploma before their first registration with the University;
4. Have successfully completed the high school subjects required for the college/division and curriculum for which application is made;
5. Have completed the Scholastic Aptitude Test and have requested that the results be submitted *directly* to the University by the Educational Testing Service. It is strongly recommended that applicants take the SAT at the end of their junior year in high school. For further information on the SAT, applicants should consult their high school counselor or write to the Educational Testing Service, Princeton, New Jersey 08540. To have the test results sent to the University of Maryland at College Park, use the College Park code number (5814) in the proper place on the test.

ACADEMIC REQUIREMENTS FOR MARYLAND RESIDENTS

Minimum Academic Criteria

The minimum criteria to be eligible for consideration for admission are a C average (when D is the lowest passing grade) in academic courses and rank in the upper half of the high school class or a predicted grade point average at the end of the first year at the University of 1.75 (prediction based on high school grade point average, class rank and SAT scores).

Guaranteed Admission

Applicants who predict a grade point average of 1.90 or better and who meet other requirements will be offered admission as soon as necessary documents are received and processing is completed. The predicted grade point average will be calculated using either an equation which includes high school grade point average, class rank and SAT scores or an equation which considers only high school grade point average and class rank.

Deferred Decision

Applicants who predict 1.75 but less than 1.90 (when SAT scores are included in the prediction equation) or who have a C and rank in the upper half of their class but predict less than 1.75 will be placed in a deferred decision group. Those applicants to be offered admission will be chosen on the basis of random selection.

Decisions through the random selection process will be made in April and July. Applicants considered in the random selection process in April will not be eligible for consideration in the July group. Consult the admissions calendar on page 6 for appropriate deadlines.

Predictive Index

A predictive index or predicted grade point average, as it has been developed and used at the University of Maryland, is the academic average predicted for a student at the end of the freshman year. The predictive index is simply forecasting an average at the end of the freshman year.

Four components in varying combinations are used to compute the University of Maryland predictive index: (1) grades earned in academic courses in high school, (2) high school class rank, (3) SAT verbal scores, and (4) SAT math scores.

The Out-of-State Applicant

The University will offer admission to a limited number of non-resident freshman applicants of proven academic ability for whom particular programs at the University are especially relevant.

School of Architecture

Admission to the School of Architecture is competitive with selection based on previous academic achievement. The School of Architecture does not accept entering students for the spring semester.

TRANSFER STUDENT ADMISSION

General Requirements

An applicant must be in good standing in scholarship and character to be considered for admission.

Academic Requirements For Maryland Residents

Transfer applicants who are residents of Maryland are required to have at least a C average (2.0 on a 4.0 scale) in all previous work or the Associate of Arts degree.

Applicants from Maryland community colleges to be eligible to matriculate beginning with the

summer 1973 must have completed the Associate of Arts degree or at least 56 semester hours with at least a C average prior to entering the University.

Maryland residents who are not admissible as high school seniors and who are attending a college other than a Maryland community college must complete at least 28 credit hours with a C average to become eligible for admission to the University.

The Out-of-State Transfer Applicant

The University will offer admission to a limited number of non-resident transfer applicants of proven academic ability for whom particular programs are especially relevant. While not guaranteeing admission, non-resident transfer students are expected to have at least a B average in all previous college work to be considered.

School of Architecture

Admission to the School of Architecture in the Division of Arts and Humanities is competitive with selection based on the transfer student's previous academic achievement. The School of Architecture does not accept entering students for the spring semester.

Transfer Credit

Advanced standing is assigned to transfer students from accredited institutions prior to registration. Academic courses carrying a grade of C or higher usually are transferable provided they are applicable to the curriculum into which the student is transferring.

Transfer of Credit from Community Colleges

A maximum of sixty (60) academic credits are transferable from community colleges. Community college students who have earned credit at a four year institution must include those earned credits in the maximum of sixty (60) academic credits transferable. In general, courses taken at a community college which are equivalent to junior or senior level courses at the University may not be transferred.

Foreign Language Credit

Transfer foreign language credit is usually acceptable in meeting requirements. Prospective students should consult the appropriate sections of this catalog to determine the specific requirements of various colleges and curricula.

Credit By Examination

Transfer credit will not be granted when earned only by examination at other institutions.

The Academic Retention Plan

The academic average of a transfer student at the University of Maryland is based *only* on those courses actually taken at the University. Credit hours for courses taken at other institutions may be transferred, but grades and quality points do not transfer. The level of expectation of academic performance, however, is determined by the total number of credit hours transferred plus the number of hours attempted at the University.

RESIDENCY POLICY

The Office of Admissions is responsible for undergraduate residence classifications. The Admissions staff is available to render assistance with any questions a student may have regarding his residence classification.

Persons who are interested in obtaining a copy of the University of Maryland residence requirements or who wish assistance with their residence classification should contact:

Office of Admissions
North Administration Building
University of Maryland
College Park, Maryland 20742
(301) 454-4137

EQUAL OPPORTUNITY RECRUITMENT PROGRAM

The Equal Opportunity Recruitment Program (EORP) is designed to intensify recruitment efforts of minority and disadvantaged students. The rationale for intensive, prolonged efforts in recruitment and supporting services for these students lies not only in the potential benefit given to the students themselves, but in the contributions they may make to the Campus community and ultimately to the State.

Further information may be obtained from the EORP office, Admissions and Registrations Office. North Administration Building, University of Maryland, College Park, Maryland 20742 or by phone at 454-4535.

SPECIAL STUDENT ADMISSION

Applicants over 21 years of age who qualify for admission but who do not desire to work toward a baccalaureate degree may be admitted as special students. These students are ineligible to matriculate for a degree until they have submitted all required documents. Permission from the academic office of the various units of the University is often needed in order to enroll as a special student.

Special students who have received a baccalaureate degree are advised that no credit earned while enrolled as special students may be applied at a later date to a graduate program. These post-

baccalaureate students may enroll in undergraduate courses for which they possess the necessary prerequisites, but may not enroll in courses restricted to graduate students only.

FOREIGN STUDENT ADMISSION

The foreign student applying for admission to the undergraduate schools of the University of Maryland should make application at least six months in advance of the term for which he is applying. He will be required to submit (1) an application for admission on a form furnished by the Admissions Office of the University upon request, (2) official copies of his secondary school preparation, (3) certificates of completion of state secondary school examinations, and (4) records of college or university studies completed in schools in the United States or elsewhere (documents indicated in (2), (3), and (4) must be accompanied by certified English translations when original documents are in languages other than English). He will also be required to furnish proof of adequate finances (students on F visas are not permitted to work). Further he will need to furnish proof of his ability to read, write, speak, and understand English sufficiently well to pursue satisfactorily an approved course of study in one of the colleges/divisions of the University. Information can be obtained from the Office of the Director of International Education Services and Foreign Student Affairs regarding the administration of the Test of English as a Foreign Language (TOEFL) both in the United States and abroad. TOEFL is the standard test used by the University to determine English proficiency.

Because the University of Maryland is a state university, it is limited in the number of foreign students whom it can admit each year. Consequently, admission is extremely competitive and offered only to those applicants who are most highly qualified.

The foreign student accepted for admission to the University will receive from the Director of Foreign Student Affairs the appropriate immigration form needed to secure a student visa from the American consul.

Every foreign student is expected to notify the Director of Foreign Student Affairs as to the approximate date of his arrival at the University and arrange to arrive in time for the special orientation program that precedes registration. The office of the Director is located in the North Administration Building, Room 222-A.

GRADUATE STUDENT ADMISSION

Admission to graduate study at the University of Maryland is the responsibility of The Graduate School. Correspondence concerning application for admission to The Graduate School should be addressed to The Graduate School, University of Maryland, College Park, Maryland 20742.

APPLICATION PROCEDURES

Application Forms

Application forms may be obtained by writing to:

Director, Office of Admissions
North Administration Building
University of Maryland
College Park, Maryland 20742

Application forms are available in the high school guidance offices and college counseling centers.

All applicants must comply fully with the directions printed on the application form. Incomplete forms cannot be processed.

Application Fee

A non-refundable $15.00 application fee is required with each application received after June 1, 1973.

Deposit

An applicant who receives an offer of admission is required to submit a deposit of $50 within three weeks after the date of the offer of admission. Failure to submit the deposit within the required time limit will be considered evidence that the applicant does not plan to matriculate at the University of Maryland, College Park Campus, and the offer of admission will be cancelled.

Refunds of the $50 deposit will be made provided a written request for refund is received by the Admissions Office not later than June 1.

CLOSING DATES FOR APPLICATIONS

Fall Semester

All applications for undergraduate admission for the fall semester at the College Park Campus must be received by the Admissions Office not later than May 1. The University strongly urges an early application for all applicants. The University reserves the right to return the unprocessed applications of non-resident freshmen and transfer students when the quota for such students has been reached. Because of space limitations, the University cannot offer admission to all qualified out-of-State applicants. An early application is, therefore, essential.

All supporting documents for an application for admission must be received by the appropriate University office not later than June 15 in the case of freshman applicants and not later than July 1 for transfer applicants. Supporting documents include education records, SAT scores (in the case of new freshmen), and medical examination reports.

Spring Semester

The deadline for the receipt of applications for the spring semester is November 1. All supporting documents for an application must be received not later than November 15.

Exceptions

Applications for the School of Architecture including supporting documents must be received not later than March 1.

Foreign students are required to submit their applications not later than February 1 for the Fall semester and not later than August 1 for the spring semester.

ADMISSIONS CALENDAR

Applicants for Fall 1973

February—

1—Deadline for foreign student applications

March—

1—Deadline for receipt of applications and documents to be eligible for inclusion in April random selection process

May—

1—Deadline for undergraduate applications

June—

15—Deadline for documents for freshman applicants

July—

1—Deadline for all documents for transfer applicants

Applicants for Spring 1974

June—

1—Begin accepting applications for spring

August—

1—Deadline for foreign student applications

November—

1—Deadline for undergraduate applications

15—Deadline for all documents

READMISSION AND REINSTATEMENT

Students who do not maintain continuous registration must apply for readmission or reinstatement when they desire to return to the University. See sections below on Withdrawals from the University and Minimum Requirements for Retention and Graduation.

Readmission

A student who has interrupted his registration for one or more semesters and who was in good academic standing or on scholastic probation at the conclusion of his last semester must apply for readmission.

Reinstatement

A student must apply for reinstatement if he has been academically dismissed, is ineligible for readmission, or has withdrawn from all courses in his last previous semester.

Deadlines

To be considered for immediate reinstatement following dismissal at the end of the fall or spring terms, a currently enrolled student must apply no later than seven days before the first day of registration of the spring or second summer term. If dismissed at the end of the spring semester, a student may not apply for the first summer term.

All other students must apply in accordance with the following deadlines:

Fall term	July 1
Spring term	November 1
Summer term	May 1

Applications

Application forms for readmission and reinstatement may be obtained from the Office of Admissions.

ADDITIONAL INFORMATION

For additional information contact the Admissions Office, North Administration Building, University of Maryland, College Park, Maryland 20742; telephone number (301) 454-5550.

ORIENTATION PROGRAMS

Freshmen Orientation and Registration

Upon final admission to the University the student will receive materials pertaining to his participation in The Freshmen Orientation and Registration Program for the University of Maryland. All entering freshmen are urged to attend this program which is administered by the Director of Orientation of the Office of Student Activities. The primary goals of the program are to inform the student about the University and help him register for the fall semester. The program is operated at the College Park Campus during the summer months. Each freshman will attend with a group of his future classmates. He will engage in the following:

1. Formal and informal discussions about University life and the standards of performance the University will expect of him.
2. A conference with a faculty advisor in his college who will assist him in selecting and registering for fall semester courses. (To assure the success of this conference, please have the SAT scores submitted to the University early in the spring.)

Through this program, the entering student receives a personalized and individual introduction to the University.

Transfer Student Orientation

Upon admission to the University, the transfer student receives information concerning an orientation program that is held during the summer. This program includes a conference with advisors to explain academic requirements, registration for fall classes, and a general orientation to the campus itself. The program is particularly geared to the needs of upper class students and their special concerns.

Parent Orientation

Running concurrently with the summer programs for freshmen and transfer students is an orientation program for the parents of new students. Here, parents have an opportunity to learn about the academic, cultural, and social aspects of University life, from administrators and staff as well as from the student sponsors who lead the student groups.

Foreign Student Orientation

All foreign students admitted to the University including transfer students are required to attend the special orientation program arranged by the Office of Foreign Student Affairs with the cooperation of the International Club. This program is held during the week preceding registration each semester. The program is designed to help new students become acquainted with the University and the community in order to understand the opportunities and responsibilities presented by their new educational and cultural environment.

EXPENSES, FINANCIAL AID AND SCHOLARSHIPS

EXPENSES

Returning students will not be permitted to complete registration until all financial obligations to the University including library fines, parking violation assessments and other penalty fees and service charges are paid in full.

All checks or money orders should be made payable to the University of Maryland for the exact amount due. In cases where the University has awarded a grant, scholarship, or workship, the appropriate amount will be deducted on the bill.

No degree will be conferred, nor any diploma, certificate, or transcript of record issued to a student who has not made satisfactory settlement of his account.

Although changes in fees and charges ordinarily will be announced in advance, the University reserves the right to make such changes without prior announcement.

FEES FOR RESIDENTS AND NON RESIDENTS
1973-74 ACADEMIC YEAR

	Fall Semester	*Spring Semester*	*Total*
Fees for full-time Undergreduete Students:			
Maryland Residents			
General Fee *	$ 349.00	$ 349.00	$ 698.00
Board Contract **	305.00	305.00	610.00
Lodging	235.00	235.00	470.00
	$ 889.00	$ 889.00	$1,778.00
Residents of District of Columbia, Other States and Other Counties			
General Fee *	$ 849.00	$ 849.00	$1,698.00
Board Contract **	305.00	305.00	810.00
Lodging	285.00	285.00	570.00
	$1,439.00	$1,439.00	$2,878.00
Fee for part-time Undergraduate *** Credit Hour Fee (eech credit)			$ 28.00

*General Fee includes Fixed Fee of $560 for Maryland residents or $1,560 for residents of the District of Columbia, other states and foreign countries plus mandatory fees for the following: Instructional Materials, Athletics, Student Activities, Recreational Facilities, and Auxiliary Facilities.

**Board Contract—the amount stated above is for a 7 day a week food plan; an optional 5 day plan is avaieble at $275 a semester or $550 for an academic year. Board charges may be increased prior to the 1973-74 academic year if required by cost increases.

***The term "part-time student" is interpreted to mean undergraduate student teking 8 semester credit hours or less. Students carrying 9 semester hours are considered to be full-time and must pay the regular full-time fees.

Explanation of Fees

The application fee for the undergraduate colleges and the summer session partially defrays the cost of processing applications for admission to the University. If a student enrolls for the term for which he applied, the fee is accepted in lieu of the matriculation fee. Applicants who have enrolled with the University of Maryland in its Evening Division at College Park or Baltimore, or at one of its off-campus centers are not required to pay the fee since they have already paid a matriculation fee.

The Fixed Charges Fee is charged to help defray the cost of operating the University's program at College Park.

The Instructional Materials Fee represents a charge for instructional materials and/or laboratory supplies furnished to students.

The Athletic Fee is charged for the support of the Department of Intercollegiate Athletics. All students are encouraged to participate in all of the activities of this department or to attend the contests if they do not participate.

The Student Activities Fee is a mandatory fee included at the request of the Student Government Association. It covers class dues and is used in sponsoring various student activities, student publications and cultural programs.

The Recreational Facilities Fee is paid into a fund which will be used to expand the recreational facilities on the College Park Campus, especially the Student Union Building.

The Auxiliary Facilities Fee is paid into a fund which is used for expansion and operation of various facilities such as roads, walks, campus lighting and other campus facilities. These facilities are not funded or are funded only in part from other sources.

OTHER FEES

Application Fee ..... $ 15.00

Enrollment Deposit Fee 50.00
This fee is non-refundable after June 1st.

Pre-College Orientation Program Registration Fee .. 15.00

Registration Fee (Charged as a separate fee for all registrants except full-time undergraduates) 5.00

Late Application Fee 25.00

Matriculation Fee 15.00

Graduation Fee for Bachelor's degree 15.00

Room Deposit Fee payable upon application for dormitory room 50.00
(To be deducted from the first semester room charges at registration.)

Vehicle Registration Fee 12.00
(12.00 for first vehicle and $3.00 for each additional vehicle in accordance with published regulations. Payable each academic year by all students registered for classes on the College Park Campus and who drive on the Campus. For cars registered for the spring semester only the fee is $6.00 for the first car and $1.50 for each additional vehicle.)

Special Fee for students requiring additional preparation in Mathematics per semester 75.00
(Required of students whose curriculum calls for MATH 010 or 018 and who fail in qualifying examination for these courses. Students enrolled in this course and concurrently enrolled for 6 or more credit hours will be considered as full-time students for purposes of assessing fees.)

Fees for Auditors and courses taken for audit are the same as those charged for courses taken for credit at both the undergraduate and graduate levels. Audited credit hours will be added to hours taken for credit to determine whether or not an undergraduate student is full-time or part-time for fee assessment purposes.

Special students are assessed fees in accordance with the schedule for the comparable undergraduate or graduate classification.

Late Registration Fee 20.00
(All students are expected to complete their registration, including the filing of class cards on the regular registration days. Those who do not complete their registration during the prescribed days must pay this fee.)

Change of Registration Fee (for each course dropped or added after registration period) 2.00

Special Examination Fee—to establish college credit—per semester hour 5.00

Transcript of Record Fee (each copy) 2.00

Property Damage Charge: Students will be charged for damage to property or equipment. Where responsibility for the damage can be fixed, the individual student will be billed for it; where responsibility cannot be fixed, the cost of repairing the damage or replacing equipment will be prorated.

Service Charges for Dishonored Checks: Payable for each check which is returned unpaid by the drawee bank on initial presentation because of insufficient funds, payment stopped, post-dating, drawn against uncollected items, etc.

For checks up to $50.00 ..... 5.00

For checks from $50.01 to $100.00 ..... 10.00

For checks over $100.00 ..... 20.00

Library Charges:

Fine for failure to return book from General Library before expiration of loan period per day ..... .25

Fine for failure to return book from Reserve Shelf before expiration of loan period

First hour overdue on first day 1.00

After first hour on first day 2.00

Each additional day 2.00

In case of loss or multilation of a book, satisfactory restitution must be made.

Motor Vehicle Penalties—See page 45.

TEXTBOOKS AND SUPPLIES

Textbooks and classroom supplies: These costs vary with the course pursued, but will average per semester 85.00

Payment of Fees: All checks, money orders, or postal notes should be made payable to the University of Maryland.

WITHDRAWAL OR REFUND OF FEES

Any student compelled to leave the University at any time during the academic year should file an application for withdrawal, bearing the proper signature, in the Registrations Office. If this is not done, the student will not be entitled, as a matter of course, to a certificate of honorable dismissal, and will forfeit his right to any refund to which he would otherwise be entitled. The date used in computing refunds is the date the application for withdrawal is filed in the Registrations Office.

In the case of a minor, withdrawal will be permitted only with the written consent of the student's parent or guardian.

Students withdrawing from the University will be credited for all academic fees charged to them in accordance with the following schedule:

Period from Date Instruction Begins	Refundable
Two weeks or less	80%
Between two and three weeks	60%
Between three and four weeks	40%
Between four and five weeks	20%
Over five weeks	00%

No part of the charges for room and board is refundable except when the student officially withdraws from the University or when he is given permission by the appropriate officials of the University to move from the residence halls and/or to discontinue dining hall privileges. In these cases, the room refund will be computed by deducting a $20 service charge for the semester and the remainder will be pro-rated on a weekly basis. Refunds to students having full board contracts will be calculated in the same manner. No room and/or board refunds will be made after the fourteenth week of the semester.

The Food Service identification cards (FSID) must be surrendered to the Administrative Office of the Main Dining Hall before any refund will be processed.

In computing refunds to students who have received the benefit of scholarships and loans from University Funds, the computation will be made in such a way as to return the maximum amount to the scholarship and loan accounts without loss to the University.

A student who registers as a full time undergraduate will receive no refund of the General Fee when courses are dropped until sufficient courses are dropped to change status from full time undergraduate to part time undergraduate. The difference between general fees assessed as a full time undergraduate and the credit hour fees assessed as a part time student will be refunded in accordance with the above refund schedule.

A student who registers as a part time undergraduate student will be given a refund of the credit hour fee in accordance with the above refund schedule for courses dropped.

A special refund schedule applies to full-time students who are drafted into the Armed Services or called up as Reservists.

TRANSCRIPT OF RECORDS

Students and alumni may secure transcripts of their scholastic records from the Registrations Office. There is a charge of $2.00 for each transcript. Checks should be made payable to the University of Maryland. Transcripts of records should normally be requested in writing at least two weeks in advance of the date when the records are actually needed. No transcript of a student's record will be furnished any student or alumnus whose financial obligations to the University have not been satisfied.

FUNDS TO MEET PERSONAL EXPENSES

In the past new students have sometimes arrived on campus with a check payable to the University for an amount larger than that required to meet tuition costs and related expenses. They often expect to pay their University bill and receive a refund to meet personal expenses. However. the University is unable to accept such checks or to make refunds to students.

Any students arriving early should have adequate personal funds to meet expenses.

We recommend that those students arriving early and receiving financial aid from various sources request that their check be made payable to them instead of the University. This will allow the establishment of a personal bank account which can be used to pay for personal expenses and for University fees.

FINANCIAL AID

The Office of Student Aid provides advice and assistance in the formulation of student financial plans and, in cooperation with other University offices, participates in the awarding of scholarships, loans, and part-time employment to deserving students. Scholarships, grants and loans are awarded on the basis of evident academic ability and financial need. In making awards, consideration is also given to character, achievement, participation in student activities, and to other attributes which may indicate success in college. It is the intent of the committee to make awards to those qualified who might not otherwise be able to pursue college studies. Part-time employment opportunities on campus are open to all students, but are dependent upon the availability of jobs and the student's particular skills and abilities.

Additional information is available from the Director, Office of Student Aid, Room 222, North Administration Building, University of Maryland, College Park, Maryland 20742.

SCHOLARSHIPS AND GRANTS

Most scholarships are awarded to students before they enter the University. However, students who have completed one or more terms, and have not received such an award, are eligible to apply. Most of these scholarships are awarded to students who have earned a cumulative grade point average of 3.0 (B) or better. Entering freshmen must submit applications before March 1; students already enrolled in the University may submit applications between February 1 and May 1 in order to receive consideration for scholarship assistance for the ensuing year.

Scholarship award letters are normally mailed between March 15 and June 15. Any applicant who does not receive an award letter during this period should assume that he has not been selected for a scholarship.

FULL SCHOLARSHIPS. The University awards 56 full scholarships covering board, lodging, fixed charges, and fees. Not more than twenty of these scholarships may be held by out-of-state students, and at least twelve are reserved for women. Scholastic achievement and participation in student activities are given primary consideration.

UNIVERSITY GRANTS. The University awards to deserving and qualified secondary school graduates a limited number of grants covering fixed charges only.

SPECIAL ACADEMIC SCHOLARSHIPS. A limited number of scholarships are awarded each year to students of exceptional ability out of funds derived from campus enterprises. The amount of these scholarships varies, depending upon the extent of need.

ENDOWED SCHOLARSHIPS AND GRANTS. The University has a number of endowed scholarships and special grants. These range in value from $100 to $1,000. Recipients are chosen by the University in accordance with terms established by the donor. It is usually inadvisable for a student to apply for a specific scholarship. Each applicant will receive consideration for all scholarships for which he is eligible.

EDUCATIONAL OPPORTUNITY GRANTS. Under provisions of the Higher Education Act of 1965, limited grants are available to encourage youths of exceptional financial need to continue their post-secondary school education. A recipient must be a United States citizen enrolled as a full-time undergraduate. The amount of the grant must be matched by an equal amount of some other type of aid provided through the University.

NURSING SCHOLARSHIPS. Nursing students of exceptional financial need are eligible to receive assistance under the provisions of the Health Manpower Act of 1968. Students submitting applications for financial aid will be automatically considered for both scholarship and loan.

MARYLAND STATE SCHOLARSHIPS. The General Assembly of Maryland has created several programs of scholarships for Maryland residents who need financial help to obtain a college education. The undergraduate programs are (1) General State scholarships, (2) Senatorial scholarships, and (3) House of Delegates scholarships. Students wishing to apply for these scholarships should contact their guidance counselor if a high school senior or the Office of Student Aid if presently attending the University of Maryland. Students who are entering college for the first time must take the Scholastic Aptitude Test in November or December of their senior year. The test is not required of college students who have completed at least one academic year. A general application and a Parent's Confidential Statement should be filed with College Scholarship Service in Princeton, N.J. and a senatorial application with the student's state senator by December 1 for the following academic year. For additional information, contact the Maryland State Scholarship Board, 2100 Guilford Avenue, Baltimore, Maryland 21218.

LOCAL AND NATIONAL SCHOLARSHIPS. In addition to the scholarships provided by the University of Maryland, a student should give careful consideration to scholarship aid provided by local and national scholarship programs. Ordinarily, the high school principal or counselor will be well informed as to these opportunities.

LOANS

Loan funds to meet educational expenses are available for students enrolled in the University. The extent of financial need must be clearly established by providing a complete statement of the applicant's financial resources and estimated expenses for the academic year.

Loan awards are normally granted on a yearly basis, although short-term and emergency loans are granted for shorter periods.

To apply for a long-term loan, an application should normally be filed before June 15 for the ensuing year. If funds are available, applications may be considered at other times, but the student should bear in mind that it generally takes about six weeks to process a loan.

Students applying for a loan must have a 2.0 (C) average for courses taken the preceding semester. New students need a 2.5 average in academic subjects for the previous two years of school.

Loans are not available for non-educational expenses, nor are they available for repayment of previously incurred indebtedness.

NATIONAL DIRECT STUDENT LOAN PROGRAM. This loan fund was established by the Federal government in agreement with the University of Maryland to make low-interest loans available to students with clearly established financial need. Applicants must be United States nationals (citizens and permanent resident status) and must be enrolled for eight or more credit hours at day school on the College Park Campus.

The average approved loan is about $600 per year. The borrower must sign a note. Repayment begins one year after the borrower leaves school and must be completed within ten years thereafter. No interest is charged until the beginning of the repayment schedule. Interest after that date is charged at the rate of three percent per annum.

U. S. LOAN PROGRAM FOR CUBAN STUDENTS. Loan funds are available to Cuban nationals under terms similar to the NDSL Loans.

NURSING STUDENT LOANS. Loans up to $2,500 per year are available under provision of the Nurses Training Act of 1964 as amended. The borrower must be a full-time student pursuing a baccalaureate or graduate degree in nursing and able to establish financial need. Repayment begins one year after the borrower ceases to be a full-time student and must be completed within ten years thereafter. No interest is charged until the beginning of the repayment schedule. Interest after that date accrues at the rate of three percent per annum.

Up to eighty-five percent of the loan plus interest may be cancelled in the event that the borrower is employed full-time as a nurse in a public or nonprofit institution or agency. In the event of total or permanent disability or death, the borrower's obligation is automatically cancelled.

INSTITUTIONAL STUDENT LOANS. Institutional loan funds have been established through the generosity of University organizations, alumni, faculty, staff, and friends. These loans are normally available at low interest rates to upperclassmen only. For specific information, the student should inquire at the Office of Student Aid.

LAW ENFORCEMENT EDUCATION PROGRAM LOAN AND GRANT. Loans: Qualified full-time pre-service students in approved fields may apply for loan assistance up to $1,800 per academic year. The loan is cancelled at the rate of 25 percent per year of full-time employment in criminal

justice or repaid at the rate of 7 percent simple interest, commencing six months after termination of full-time study. Grants: In-service employees of police, courts and corrections agencies enrolled in courses related to law enforcement can receive up to $300 per semester (not to exceed cost of tuition and fees). Grant recipients must agree to remain in the service of their employing law enforcement agency for at least two years following completion of their courses. Any student who meets the eligibility requirements for both a loan and a grant may receive both concurrently. Interested students should contact either the Dean, University College, or Director, Institute of Criminal Justice and Criminology, College of Arts and Sciences.

BANK LOANS. Loan programs have been established through the Maryland Higher Education Loan Corporation and the United Student Aid Fund which permit students to borrow money from their hometown banks. The programs enable undergraduates in good standing to borrow up to $1,250 per year, and notes may not bear more than seven percent simple interest. Monthly repayments begin ten months after graduation or withdrawal from school. The Federal government will pay the interest for eligible students, while the student is in school. Further details and a listing of participating banks may be secured from the Office of Student Aid.

PART-TIME EMPLOYMENT

More than one-half of the students at the University of Maryland earn a portion of their expenses. The Office of Student Aid serves without charge as a clearing house for students seeking part-time work and employers seeking help. Many jobs are available in the residence halls, dining halls, libraries, laboratories, and elsewhere on campus and off campus.

Working during college years may offer advantages in addition to the obvious one of financing a college education. The employed student has a special opportunity to learn new skills, to develop good work habits, and to learn how to get along with people. Part-time employment experience often is helpful to the student in making his career choice.

The Office of Student Aid welcomes the opportunity to counsel a student about employment. However, securing a position through intelligent application and retaining that position through good work is the individual's responsibility.

Freshman students who do not need financial aid probably should not attempt to work during the first year at the University. Adjustment to college study and to the changes from life at home usually require the student's best efforts without the added responsibility of partial self-support.

However, freshman students who need to work in order to attend the University are advised to consider employment in one of the dining halls. A student may earn approximately one-half of his board and room by working nine hours per week. After one successful semester the student may earn full board and room by working a maximum of 17 hours per week.

For positions other than food service, a student normally cannot arrange for employment until he is on campus at the beginning of a school session. Application must be made in person and the applicant should have a schedule of his classes and study hours so that he can seek employment best suited to his free time.

Foreign students must have clearance from the Office of Foreign Student Affairs before they may engage in employment.

COLLEGE WORK-STUDY PROGRAM

Under provisions of the Economic Opportunity Act of 1964, employment may be awarded to students who, (1) are in need of employment in order to pursue a course of study at a college or university, and (2) are capable of maintaining good standing in the course of study while employed. Under the work-study program, students may work up to fifteen hours per week during the school year and full time during the summer.

It is the intent of the Student Aid Committee to combine his type of assistance with scholarships and loans so that students from low income families will be able to attend the University.

SCHOLARSHIPS

Regulations and procedures for the awarding of scholarships are formulated by the Committee on Financial Aids. The Board of Regents of the University authorizes the award of a limited number of scholarships each year to deserving students. Applicants are subject to the approval of the Director of Admissions, insofar as qualifications for admission to the University are concerned. All recipients are subject to the academic and nonacademic regulations and requirements of the University.

The recipient of the scholarship or grant is expected to make at least normal progress toward a degree, as defined by the Academic Regulations.

The Committee reserves the right to review the scholarship program annually and to make adjustments in the amount and recipients of awards in accordance with the funds available and scholastic attainment.

The general types of scholarships and grants are listed on pages 10 and 11. Specific endowed programs are:

ENDOWED AND ANNUAL SCHOLARSHIPS AND GRANTS

AFROTC COLLEGE SCHOLARSHIP PROGRAM—This program provides scholarships for selected cadets each year in the four-year AFROTC program. Those selected receive money for full tuition, laboratory expenses, incidental fees,

and an allowance for books for up to eight semesters. In addition, they receive nontaxable pay of $50 per month. One must be in the program at the University of Maryland before he can apply for this scholarship.

AIR FORCE WARRANT OFFICERS ASSOCIATION STUDENT AID PROGRAM—Scholarship aid has been made available by the Air Force Warrant Officers Association for worthy male or female undergraduate or graduate students in good standing, with preference given to children of Air Force Warrent Officers or other military personnel.

ALBRIGHT SCHOLARSHIP—The Victor E. Albright Scholarship is open to graduates of Garret County high schools who were born and reared in that county.

AGRICULTURAL DEVELOPMENT FOUNDATION—A number of awards are made to agricultural students from a fund contributed by donors for general agricultural development.

ALCOA FOUNDATION SCHOLARSHIP AWARDS of $750 are given to outstanding students majoring in transportation, mechanical engineering, and fire protection engineering.

ALUMNI SCHOLARSHIPS—A limited number of scholarships are made possible through the gifts of alumni and friends to the Alumni Annual Giving Program of the Office of Endowment and Gifts.

ALUMNI ASSOCIATION OF THE SCHOOL OF PHARMACY SCHOLARSHIPS—The Alumni Association of the School of Pharmacy of the University of Maryland makes available annually scholarships to qualified prepharmacy students on the basis of character, achievement and need. These scholarships are open only to residents of the State of Maryland. Each scholarship not exceeding $500 per academic year is applied to expenses at College Park.

ALUMNI BAND SCHOLARSHIP—A limited number of awards to freshmen are sponsored by the University of Maryland Band Alumni Organization. Recipients are recommended by the Music Department after a competitive audition held in the spring.

ETHEL R. ARTHUR MEMORIAL SCHOLARSHIP—This memorial scholarship fund has been established by Irving J. Cohen, M.D. At least one $250 award is made each year by the Scholarship Committee. A preference is given to students from Baltimore.

ALVIN L. AUBINOE STUDENT AID PROGRAM—Scholarship grants up to $500 per school year to students in engineering, preferably those studying for careers in civil engineering, architecture or light construction.

BALTIMORE PANHELLENIC ASSOCIATION SCHOLARSHIP—A scholarship is awarded annually by the Baltimore Panhellenic Association to a student entering the junior or senior class, who is an active member of a sorority, who is outstanding in leadership and scholarship and who needs financial assistance.

BALTIMORE SUNPAPERS SCHOLARSHIP IN JOURNALISM—The Board of Trustees of the A. S. Abell Foundation, Inc., contributes funds to provide one or more $500 scholarships to students majoring in editorial journalism.

BAYSHORE FOODS, INC. SCHOLARSHIP—A grant of $500 is made available annually to sons and daughters of employees of Bayshore Foods, Inc. of Easton, Md.

BLACK AND DECKER MANUFACTURING COMPANY SCHOLARSHIP—A scholarship of $500 per year is provided for a Maryland resident who promises to teach Industrial Arts or Vocational-Industrial Education in Maryland for two years after graduation.

CAMPUS AND NEWCOMERS SCHOLARSHIP—Awards are made from a fund created by the campus and Newcomers Club of the University.

CAPITOL MILK PRODUCERS COOPERATIVE, INC. SCHOLARSHIP—A scholarship of $500 is awarded annually in the College of Agriculture, preferably to a student preparing for a career in the dairy industry.

GEORGE C. COOK SCHOLARSHIP—A full scholarship is made available by the Maryland Educational Foundation in memory of the late George C. Cook. Preference shall be given to students interested in a career in business administration or marketing.

DR. ERNEST N. CORY SCHOLARSHIP—This memorial award is made annually to an outstanding junior or senior recommended by the College of Agriculture, preferably one majoring in entomology.

DAIRY TECHNOLOGY SCHOLARSHIP AND GRANTS—The Dairy Technology Society of Maryland and the District of Columbia provides a limited number of scholarships and grants-in-aid for students majoring in dairy products technology.

DELAWARE-MARYLAND PLANT FOOD ASSOCIATION SCHOLARSHIP—A $200 annual award is made to an undergraduate who has an interest in agronomy and soil fertility work.

DELMARVA TRAFFIC CLUB SCHOLARSHIP—An annual award of $250 is made to a transportation student from the Delmarva Peninsula.

EXEL SCHOLARSHIP—A substantial grant for endowed scholarships was made by Deborah B. Exel.

JAMES R. FERGUSON MEMORIAL FUND—A scholarship award is made annually to a student enrolled in Animal Science on the basis of academic achievement and financial need.

FMC CORPORATION SCHOLARSHIP—An annual award of $500 is made available for a senior in chemical engineering.

ANNE ARUNDEL COUNTY VOLUNTEER FIREMEN'S ASSOCIATION GRANT—This tuition and fees grant is awarded to a high school graduate who will enroll in the fire protection curriculum in the College of Engineering. The award is normally for four years.

BALTIMORE COUNTY VOLUNTEER FIREMAN'S ASSOCIATION GRANT—This tuition and fees grant is awarded to a student who will enroll in the fire protection curriculum in the College of Engineering. The award is normally for four years.

LADIES AUXILIARY TO THE MARYLAND STATE FIREMEN'S ASSOCIATION GRANT—This $750 grant is awarded to an outstanding high school graduate who will enroll in the fire protection curriculum in the College of Engineering. The award is normally available for four years.

MARYLAND STATE FIREMEN'S ASSOCIATION GRANT—A tuition and fees scholarship is awarded annually to an outstanding high school student who enrolls in the fire protection curriculum of the College of Engineering. This scholarship is for four years.

PRINCE GEORGES COUNTY VOLUNTEER FIREMEN'S ASSOCIATION GRANT—An annual tuition and fees scholarship is awarded to an outstanding high school student who enrolls in the fire protection curriculum of the College of Engineering.

FOOD FAIR STORES FOUNDATION SCHOLARSHIPS—Several scholarships are available for $250 per academic year.

LESTER M. FRALEY HONOR AWARD—An annual honor award based upon high standards of citizenship and scholarship to an undergraduate student in Health, Physical Education or Recreation.

FREDERICK COUNTY HOLSTEIN ASSOCIATION SCHOLARSHIP—A scholarship of $200 is awarded annually to a resident of Frederick County enrolled in the College of Agriculture.

VICTOR FRENKIL SCHOLARSHIP—A scholarship of $250 is granted annually by Mr. Victor Frenkil of Baltimore to a student from Baltimore City in the freshman class of the University.

GENERAL FOODS SCHOLARSHIPS—Three scholarships of $400 each are available to students in the College of Agriculture majoring in Animal Science, Food Science or Dairy Science. Two awards are to be granted to students

majoring in Food Science and the remaining one awarded to a student in the other areas.

GENERAL MOTORS SCHOLARSHIP—This scholarship is granted to an outstanding individual entering the freshman year.

JOHN D. GILMORE SCHOLARSHIP has been established for the purpose of assisting deserving student athletes to obtain an education and participate in varsity athletics at the University of Maryland. The recipients should possess, as does John D. Gilmore, outstanding dedication, determination and an undeniable will to win in athletic competition and to succeed in life.

GODDARD MEMORIAL SCHOLARSHIP—Several scholarships are available annually under the terms of the James and Sarah E. R. Goddard Memorial Fund established through the wills of Morgan E. Goddard and Mary Y. Goddard.

ROSE L. GRANT SCHOLARSHIP—At least $500 each year is made available to be awarded by the Scholarship Committee.

JOHN WILLIAM GUCKEYSON MEMORIAL SCHOLARSHIP—A scholarship of $100 is granted annually by Mrs. Hudson Dunlap as a memorial to John William Guckeyson, an honored Maryland alumnus.

GUDELSKY MEMORIAL SCHOLARSHIP—The Gudelsky Foundation, Inc., has established a scholarship in memory of Harry Gudelsky and Isadore M. Gudelsky.

STALEY AND EUGENE HAHN MEMORIAL SCHOLARSHIP FUND—Annual awards of $500 are made by Mr. and Mrs. Walter J. Hahn in memory of their sons to aid outstanding agricultural students from Frederick County.

JAMES HARTIN ENGINEERING SCHOLARSHIP AND DONALD PETER SHAW MEMORIAL SCHOLARSHIP—These two scholarships of $300 each are made available annually by Mr. and Mrs. David C. Hartin. The first is awarded to a male student in the College of Engineering and the second to a male student in any college other than Education, or to a female student in nursing These awards will be made to worthy students who are helping to earn their own college expenses.

WILLIAM RANDOLPH HEARST FOUNDATION SCHOLARSHIPS—These scholarships are made available through a gift of the Baltimore News American, one of the Hearst newspapers, in honor of William Randolph Hearst. Scholarships up to $1,000 are awarded annually to undergraduates pursuing a program of study in journalism. Scholarships up to $1,000 are awarded annually for graduate study in history.

ROBERT MICHAEL HIGGINBOTHAM MEMORIAL AWARD FUND—This Fund has been endowed by Mr. and Mrs. Charles A. Higginbotham in memory of their son who was killed in Vietnam. Annual awards are made to promising junior students majoring in mathematics.

A. M. HOFFMAN MEMORIAL GRANT—This gift of $250 per year is normally awarded as a supplement to some other type of student aid to a student with exceptional need. A preference is given to students from Montgomery County. The gift is made available by Mr. and Mrs. David B. Schwartz.

HYATTSVILLE HORTICULTURAL SOCIETY SCHOLARSHIP—A scholarship of $200 is awarded to a student enrolled in Horticulture.

INTER-STATE MILK PRODUCERS' COOPERATIVE, INC. SCHOLARSHIP—A scholarship of $300 is made available to a student in agriculture in honor of Raymond Marvel, past-president of the cooperative.

IOTA LAMBDA SIGMA (NU CHAPTER) SCHOLARSHIP—This $200 scholarship is awarded annually to a male student in the industrial education curriculum. The student must be a resident of the State of Maryland and signify his intention of teaching in Maryland.

KAPPA KAPPA GAMMA NURSING SCHOLARSHIP—This $100 Scholarship is made available annually by the Gamma Psi chapter of the Kappa Kappa Gamma Sorority to a worthy student preparing for a career in nursing.

PAUL H KEA MEMORIAL SCHOLARSHIP FUND—This fund was established by the Potomac Valley Chapter of the American Institute of Architects in memory of Paul H. Kea, a highly respected member of the chapter.

VENIA M. KELLER GRANT—The Maryland State Council of Homemakers' Club makes available this grant of $100 which is open to a Maryland young man or woman of promise who is recommended by the College of Home Economics.

KINGHORNE FUND SCHOLARSHIP—A scholarship in honor of Mr. Joseph W. Kinghorne of the Class of 1911 of the College of Agriculture shall be awarded to the student specializing in poultry science having the highest general average at the end of his or her sophomore year. The amount of the scholarship shall equal the tuition on the College Park Campus.

KIWANIS SCHOLARSHIP—The J. S. Ray Memorial Scholarship covering tuition is awarded by the Prince George's Kiwanis Club to a male resident of Prince George's County, Maryland, who, in addition to possessing the necessary qualifications for maintaining a satisfactory scholarship record must have a reputation of high character and attainment in general all-around citizenship.

KIWANIS CLUB OF LAUREL SCHOLARSHIP—An annual award of $400 is made available to be awarded by the Scholarship Committee to needy students, preferably from the Laurel area.

LAUREL RACE COURSE, INC. SCHOLARSHIP—This fund has been established to provide scholarships for students who are participating in the University Band.

LEIDY CHEMICAL FOUNDATION SCHOLARSHIP—A scholarship of $500 is granted annually to a graduate or undergraduate student preparing for a career in the general field of chemistry.

CHRISTIAN R. AND MARY F. LINDBACK FOUNDATION SCHOLARSHIP—The Trustees of the Christian R. and Mary F. Lindback Foundation provide an annual gift to the University, one-half of which is given for scholarships in agriculture and one-half for awards to the faculty for distinguished teaching.

HELEN ALETTA LINTHICUM SCHOLARSHIP—These scholarships, several in number, were established through the benefaction of the late Mrs. Aletta Linthicum, widow of the late Congressman Charles J. Linthicum, who served in Congress from the Fourth District of Maryland for many years.

LIONS INTERNATIONAL SCHOLARSHIP—An award of $500 is available to a freshman who competes in the Lions Club. (District 22-C) Annual Band Festival. A recipient is recommended by the Music Department after a competitive audition in the spring.

LOUGHBOROUGH LIONS CLUB SCHOLARSHIP—A scholarship providing tuition and fees is awarded to a graduate of Bethesda-Chevy Chase, Walt Whitman or Walter Johnson High Schools. The recipient is selected by the University on the basis of character and financial need.

M CLUB GRANTS—The M Club of the University of Maryland provides each year a limited number of awards.

MARYLAND COOPERATIVE MILK PRODUCERS, INC. SCHOLARSHIP—A scholarship of $500 is awarded annually in the College of Agriculture, preferably to a student preparing for a career in the dairy industry.

MARYLAND-DISTRICT OF COLUMBIA ASSOCIATION OF PHYSICAL PLANT ADMINISTRATORS SCHOLARSHIP—A scholarship for fixed charges and fees is made available to a junior or senior who is interested in making the administration of a physical plant his career. The recipient must be a resident of Maryland or the District of Columbia.

MARYLAND EDUCATIONAL FOUNDATION GRANTS—This fund has been established to provide assistance to worthy students.

MARYLAND ELECTRIFICATION COUNCIL SCHOLARSHIP—This scholarship of $300 is awarded annually to an entering freshman or junior college transfer student enrolled in

the agricultural engineering curriculum in either the College of Agriculture or the College of Engineering.

MARYLAND AND VIRGINIA MILK PRODUCERS ASSOCIATION SCHOLARSHIP—A scholarship of $500 is awarded annually in the College of Agriculture, preferably to a student preparing for a career in the dairy industry.

MARYLAND PHARMACEUTICAL ASSOCIATION SCHOLARSHIP—The Maryland Pharmaceutical Association makes available annually scholarships to prepharmacy students on the basis of character, achievement and need. Each scholarship not exceeding $500 per academic year is used in partial defrayment of fees and expenses at College Park. These scholarships are open only to residents of the State of Maryland.

MARYLAND STATE GOLF ASSOCIATION SCHOLARSHIPS—A limited number of $500 scholarships are available to undergraduates in the Agronomy Department who have an interest in golf turf work.

MARYLAND TURFGRASS ASSOCIATION SCHOLARSHIP—A $250 annual award is made to an undergraduate who has an interest in agronomy and commercial sod production.

LOREN L. MURRAY AND ASSOCIATES SCHOLARSHIPS—This fund has been created to provide scholarships for Maryland residents who are admitted to the College of Education.

DR. RAY A. MURRAY SCHOLARSHIP—This award, sponsored by Maryland Chapter No. 32 of the National Institute of Farm and Land Brokers, is to be made to a worthy sophomore in the Department of Agricultural and Resource Economics, College of Agriculture.

PENINSULA HORTICULTURAL SOCIETY SCHOLARSHIP—The Peninsula Horticultural Society provides annually a $200 scholarship to the most deserving junior or senior student, a resident of Maryland from the Eastern Shore counties, who is majoring in horticulture or related subjects.

PHI ETA SIGMA SCHOLARSHIP—A limited number of $100 scholarships are available to young men entering the sophomore class who have achieved an academic average of 3.5 or higher during the freshman year.

DOUGLAS HOWARD PHILLIPS MEMORIAL SCHOLARSHIP—This scholarship fund has been endowed by Mr. and Mrs. Albanus Phillips, Jr. in honor of their son who met his untimely death in the spring before he was scheduled to attend the University, in order that worthy young male graduates of Cambridge, Maryland High School may have the opportunity he missed.

WILLIAM H. PRICE SCHOLARSHIP—This award is made annually to a worthy student who is already working to defray part of his college expenses.

PRESSER FOUNDATION SCHOLARSHIP—Awards are made to undergraduate students who are pursuing their studies with the intention of becoming music teachers.

PURCHASING MANAGEMENT ASSOCIATION OF BALTIMORE, INC., SCHOLARSHIP—An annual award of $500 is given annually to a junior or senior student in the College of Business and Public Administration preparing for a career in business administration or business management.

RALSTON PURINA SCHOLARSHIP—A scholarship of $500 is awarded annually to an incoming senior or junior of the College of Agriculture.

ENSIGN RICHARD TURNER REA MEMORIAL SCHOLARSHIP—This scholarship fund has been established by Captain and Mrs. Richard F. Rea in honor of their late son who gave his life while on active duty in the U.S. Coast Guard. Two scholarships up to $500 each are awarded annually to students in engineering.

READ'S DRUG STORES FOUNDATION SCHOLARSHIPS—The Read's Drug Stores Foundation contributes annually several scholarships to prepharmacy students on the basis of achievement, character and need. Each scholarship not exceeding $500 per academic year is applied to the fees and expenses at College Park. Recipients must be residents of the State of Maryland.

MARY ELIZABETH ROBY MEMORIAL SCHOLARSHIP—An endowed scholarship has been established by the University Park Republican Women's Club. Limited awards are made to women entering the junior or senior years who are studying in the field of political science. A preference is given to residents of Prince Georges County.

VIVIAN F. ROBY SCHOLARSHIPS—This endowed fund was established through a bequest to the University of Maryland by Evalyn S. Roby in memory of her husband, class of 1912, to provide undergraduate scholarships to needy boys from Baltimore City and Charles County.

JACK B. SACKS FOUNDATION SCHOLARSHIP—A scholarship is available on behalf of the Women's Advertising Club of Washington, D. C. for a senior student majoring in the area of marketing with specific interests in advertising.

SCHLUDERBERG FOUNDATION SCHOLARSHIP GRANT—This Grant of $500 is awarded in the College of Agriculture to a student enrolled in the animal science or food science curriculum.

DR. FERN DUEY SCHNEIDER GRANT—A $100 grant is available to a foreign woman student enrolled in the College of Education, who has completed at least one semester in residence at the University. Funds for the grant are contributed by the Montgomery and Prince George's County Chapters of the Delta Kappa Gamma Society.

F. DOUGLASS SEARS INSURANCE SCHOLARSHIP—Scholarships for Maryland students preparing for careers in the insurance industry are made available annually from a fund established by friends and associates of former State Insurance Commissioner F. Douglas Sears.

SOUTHERN STATES COOPERATIVE SCHOLARSHIPS—Two scholarships are awarded each year to sons of Southern States members—one for outstanding work in 4-H Club and the other for outstanding work in FFA. The amount of each scholarship is $300 per year and will continue for four years.

LEANDER F. STUART MEMORIAL SCHOLARSHIP—This scholarship of $300 is awarded annually to a student enrolled in the College of Agriculture.

T. B. SYMONS MEMORIAL FUND—A scholarship award is made annually to a student enrolled in agriculture on the basis of academic achievement and financial need.

THOMAS H. TALIAFERRO SCHOLARSHIP—Under the terms of the will of the late Jane G. S. Taliaferro a bequest has been made to the University of Maryland to provide scholarship aid to worthy students.

TAU BETA PI SCHOLARSHIP FUND—A limited number of scholarships are made available each year to worthy engineering students by members and alumni of Maryland Beta Chapter of Tau Beta Pi Association, Inc., national engineering honor society.

UNIVERSITY WOMEN'S CLUB, INC. MEMORIAL SCHOLARSHIP FUND—A scholarship of $150 is awarded each year to a junior or senior woman student on the basis of academic record, financial need and qualities of leadership and character. The funds are contributed by the Memorial Fund Committee of the University Women's Club of Washington, D.C.

VETERINARY SCIENCE SCHOLARSHIP—A scholarship of $300, provided by the veterinarians of Maryland, will be awarded to a student enrolled in Veterinary Science, selected on the basis of leadership, academic competence and financial need.

JOSEPH M. VIAL MEMORIAL SCHOLARSHIP IN AGRICULTURE—Scholarships totaling $600 per year are made available by Mr. and Mrs. A. H. Seidenspinner to be awarded upon the recommendation of the College of Agriculture.

WESTERN ELECTRIC SCHOLARSHIP—Two scholarships are awarded to students in the College of Engineering. The amount of the scholarship covers cost of tuition, books and fees not to exceed $800 nor to be less than $400.

WESTINGHOUSE AEROSPACE DIVISION SCHOLARSHIP—The Westinghouse Electric Corporation has established a scholarship to encourage outstanding students of engineer-

ing and the physical sciences. The scholarship is awarded to a sophomore student and is over a period of three years in six installments of $250. Students in electrical or mechanical engineering, engineering physics or applied mathematics are eligible for the award.

WOMEN'S ADVERTISING CLUB OF BALTIMORE WORK/EXPERIENCE SCHOLARSHIP—This award is available to an outstanding sophomore or junior interested in an advertising career.

WOMEN'S ARCHITECTURAL LEAGUE SCHOLARSHIP—This fund has been established to aid worthy students in the School of Architecture.

WOMEN'S CLUB OF BETHESDA SCHOLARSHIP—Several scholarships are available to young women residents of Montgomery County. Recipients must be accepted in the College of Education or the School of Nursing.

NICHOLAS BRICE WORTHINGTON SCHOLARSHIP—A $500 memorial scholarship is made available to a student in the College of Agriculture by the descendants of Nicholas Brice Worthington, one of the founders of the Agricultural College.

ACADEMIC PROGRAMS, HONORS, AND AWARDS

The University of Maryland is accredited by the Middle States Association of Colleges and Secondary Schools and is a member of the Association of American Universities. In addition, individual schools and departments are accredited by such groups as the American Association of Collegiate Schools of Business, the American Chemical Society, the National Association of Schools of Music, the Section of Legal Education and Admissions to the Bar of the American Bar Association, the American Council of Education for Journalism, the American Council on Pharmaceutical Education, the Council on Dental Education of the American Dental Association, the Committee on Accreditation of the American Library Association, the American Psychological Association, the Commission on Accreditation of the Council on Social Work Education, the Council on Medical Education of the American Medical Association, the Engineers' Council for Professional Development, the National Council for Accreditation of Teacher Education, and the National League for Nursing.

OFFICE OF THE DEAN OF UNDERGRADUATE STUDIES

In addition to student services provided by the academic departments, the deans and the divisional offices, the Office of the Dean of Undergraduate Studies is a source of further assistance. This office coordinates all student advising, supervises the Bachelor of General Studies Degree Program, General University Requirements, University Honors Programs, assists in the development and coordination of interdepartmental and interdivisional studies and is responsible for a number of other student academic interests. Students with special academic problems or students who have not declared a major will be advised through the Office of the Dean of Undergraduate Studies, Room 1115, Undergraduate Library.

BACHELOR OF GENERAL STUDIES DEGREE PROGRAM

The Bachelor of General Studies degree differs from other current degrees in that it is a degree without a concentration in a specific discipline or department.

The BGS program permits the student to obtain an education in as broad a set of disciplines or thought patterns as are offered at the College Park Campus without insisting that he adhere to a previously defined curriculum with a departmental or divisional orientation.

In this BGS program, the burden for motivation and direction is on the student. Good advice will guide him, but institutional commands will not compel him. Although this program is clearly a significant departure from current practices at this Campus, it does not depart from the high quality academic standards required of other programs.

Students who elect this program should specifically be aware that it is not designed to satisfy graduate school admission requirements or professional employment requirements. The very concept of the BGS is predicated on a broad ranging educational objective and not on the more specific requirements of graduate school and professional employment. It will be some time before the attitude of employers and graduate schools become clear toward the graduate of the BGS program. Students electing it must be aware of the uncertainties and accept the responsibilities.

Additional information may be obtained from Dr. Margaret Carthy in the Office of the Dean of Undergraduate Studies (telephone: 2530/31).

REQUIREMENTS

To receive a Bachelor of General Studies degree, a student must satisfy the following requirements:

1. *A minimum of 120 credits must be accumulated with a grade point average of at least 2.0 in all courses.*
2. *No more than 30 credits in any one department may be applied toward the required 120 credits.*
3. *The courses taken must be distributed over at least three divisions with a maximum of 60 credits in any one division counted toward the required 120 credits.*
4. *At least 45 credits must be taken at the upper level (courses numbered 300 or higher); a 2.0 average must be obtained in all upper level courses.*
5. *The student must be registered as only a Bachelor of General Studies major for at least the last 30 credits immediately preceding the awarding of the degree. A student who wishes to earn a second baccalaureate must satisfy all University requirements for the earning of two degrees.*

6. *The student pursuing the BGS program shall be advised by a faculty member either appointed by or acceptable to the Dean of Undergraduate Studies.*

ACADEMIC ADVISORS

Each student is assigned a faculty advisor whose function is to aid the student in designing his program of study.

Special advisors are assigned to students in the preprofessional curricula.

UNDERGRADUATE DEGREE PROGRAMS

One major advantage of attending a university campus is the broad range of programs available. This diversity allows the student to change from one major to another without leaving the institution, to choose from a wide spectrum of elective courses, and to benefit from daily contact with students of diverse academic interests and backgrounds.

The undergraduate majors available at College Park are as follows:

Aerospace Engineering
Agricultural Chemistry
Agricultural and Resource Economics
Agricultural Engineering
Agricultural and Extension Education
Agriculture, General
Agronomy
American Studies
Animal Science
Anthropology
Architecture
Art
Astronomy
Biological Sciences
Botany
Business Administration
Chemical Engineering
Chemistry and Biochemistry
Civil Engineering
Comparative Literature
Conservation and Resource Development
Cooperative Engineering Program
Dance
Early Childhood and Elementary Education
Economics
Education
Education for Industry
Electrical Engineering
Engineering, Undesignated
English
Entomology
Family and Community Development
Fire Protection
Food, Nutrition and Institutional Administration
Food Science
French
General Studies
Geography
Geology
German
Government and Politics
Health Education
History
Home Economics Education
Horticulture
Housing and Applied Design
Industrial Education
Information Systems Management
Journalism
Latin
Library Science Education
Law Enforcement
Mathematics
Mechanical Engineering
Microbiology
Music
Philosophy
Psychology
Physical Education
Physical Sciences
Physics
Recreation
Russian
Russian Area Studies
Secondary Education
Sociology
Spanish
Special Education
Speech and Dramatic Art
Textiles and Consumer Economics
Zoology

GENERAL UNDERGRADUATE ADVISEMENT

The Office of General Undergraduate Advisement is responsible for advising students who are completely undecided as to their choice of major.

This office also serves as a clearing house for information about all curricula and provides students with the opportunity of receiving advisement for curriculum choice.

The Office of General Undergraduate Advisement is located in Room 3149 of the Undergraduate Library. The telephone number is 454-2733.

INTENSIVE EDUCATIONAL DEVELOPMENT

The Intensive Educational Development (IED) Program provides an opportunity for educationally, economically and politically disadvantaged students who, despite a rich cultural heritage, need additional assistance in order to realize their potential. The program seeks to meet the intellectual, physical and emotional needs of students.

The purpose of the program is to utilize the services of the University of Maryland to ensure a fair opportunity for learning and to develop new services which will guarantee that each student develops to the fullest extent possible his edu-

cational, psychological and economic potential. These services include: academic advising, counseling, tutoring, academic skills improvement, and career development.

A summer academic program to provide a comprehensive orientation to the IED program and the University is designed to help entering students and enhance their adjustment to the college environment.

All students are given an opportunity to take part in program planning and developing through participating in the Student Board activities and working as a part of the staff.

For further information, please contact the IED Office, 217 North Administration Building, University of Maryland, College Park, Md. 20742.

CLASSIFICATION OF STUDENTS

No baccalaureate curriculum requires less than 120 semester hours. Actual classifications run as follows: freshman, 1-27 semester hours; sophomore, 28-55; junior, 56-85; and senior, 86 to at least 120.

A student may register for upper division courses when granted junior standing by his college. This shall be based upon earning a minimum of 56 academic hours toward his degree, completing such course requirements as the college may direct, and possessing the minimum required grade point average to remain in the University.

A senior at the University of Maryland who is within seven hours of completing the requirements for the undergraduate degree may, with the approval of his division chairman, undergraduate dean, the chairman of the department concerned, and the Graduate School, register in the undergraduate division for graduate courses, which may later be counted for graduate credit toward an advanced degree at this University. The student must be within seven credit hours of completing his undergraduate work and the total of undergraduate and graduate courses must not exceed fifteen credits for the semester. Excess credits in the senior year cannot be used for graduate credit unless proper pre-arrangement is made. Seniors who wish to register for graduate credit should apply to the Graduate School.

SPECIAL OPPORTUNITIES

Advanced Placement

Students entering the University from secondary school may obtain advanced placement and college credit on the basis of their performance on the College Board Advanced Placement examinations. These examinations are normally given to eligible high school seniors during the May preceding matriculation in college.

For achievement of a score of five or four on a given examination, the student will be granted Advanced Placement and the credit equivalent of two semester courses in that field; for achievement of a score of three, Advanced Placement and the credit equivalent of either one or two semester courses, depending upon the field of the examination, will be granted. A student earning a score of 2 on the English advanced placement examination will not need to take English Composition, but no credit will be given.

The program allows students a maximum of thirty hours credit, which may be used to meet major, minor, or elective requirements; or, where appropriate, General University Requirements. The University's program includes the advanced Placement examinations in the following areas: biology, chemistry, English, French, German, history, Latin, mathematics, physics and Spanish.

Questions about the program may be addressed to the Director of Admissions and Registrations, or the Dean of Undergraduate Studies. For detailed information about examinations and procedures in taking them, write to Director of Advanced Placement Program, College Entrance Examination Board, 475 Riverside Drive, New York, New York 10027.

Honors Program

A number of unusual opportunities are available to the superior student through the establishment of Honors Programs. Under the Office of the Dean of Undergraduate Studies, a General Honors Program is available to qualified students throughout the campus. In addition, departmental honors programs are offered for qualified majors by a number of the academic departments.

General Honors, as its name suggests, enlarges the breadth of the student's generalized knowledge; the Departmental Honors increases the depth of his knowledge in his major discipline. Both offer the student challenging academic experiences characterized by small sections, active student participation, and an Honors faculty that encourages dialogue. Individually guided research and independent study are important features of Honors work.

Each year a selected group of entering freshmen is invited into the General Honors Program on the basis of their high school records and standardized test scores.

The more than 20 Departmental Honors Programs ordinarily begin in the junior year, although a few programs begin as early as the freshman year. By agreement, students in Secondary Education in the College of Education may participate in the departmental Honors Programs of the Division of Arts and Humanities and the Division of Mathematical, Physical and Engineering Sciences.

The student who completes his Honors curriculum successfully is graduated with a citation in General or Departmental Honors, or with both.

Intrested high school students should write to the Director of Honors, 104 Francis Scott Key Hall, University of Maryland, College Park, Maryland 20742.

Agriculture

The College of Agriculture has instituted a Departmental Honors Program in Agricultural Economics.

HONOR SOCIETIES

Students who excel in scholarship and leadership may be invited to join the appropriate honor society. These include:

*Alpha Kappa Delta (Sociology)
*Alpha Lambda Delta
(Scholarship-Freshmen Women)
Alpha Sigma Lambda
(Adult Education)
Alpha Zeta (Agriculture)
Beta Alpha Psi (Accounting)
Beta Gamma Sigma (Business Administration)
*Chi Epsilon (Civil Engineering)
*Eta Kappa Nu
(Electrical Engineering)
Gamma Theta Upsilon (Geography)
Iota Lambda Sigma
(Industrial Education)
Kappa Delta Pi (Education)
*Mortar Board (Women's Scholarship
and Leadership)
Omicron Delta Epsilon (Economics)
*Omicron Delta Kappa (Men's
Scholarship and Leadership)
Omicron Nu (Home Economics)
Phi Alpha Epsilon (Physical Education)
*Phi Alpha Theta (History)
Phi Beta Kappa
(Arts and Sciences)
Phi Delta Kappa (Educational)
*Phi Eta Sigma
(Scholarship—Freshmen Men)
*Phi Kappa Phi (Senior and Graduate Scholarship)
*Phi Sigma (Biology)
Pi Alpha Xi (Floriculture)
Pi Mu Epsilon (Mathematics)
*Pi Sigma Alpha (Political Science)
*Pi Tau Sigma
(Mechanical Engineering)
*Psi Chi (Psychology)
Sigma Alpha Eta (Speech Therapy)
Sigma Alpha Iota (Women's Music)
Sigma Alpha Omicron (Bacteriology)
*Sigma Pi Sigma (Physics)
*Tau Beta Pi (Engineering)

*Members of Association of College Honor Societies.

HONORS

SCHOLARSHIP HONORS—Final honors for excellence in scholarship are awarded to one-fifth of the graduating class in each College. "HIGH HONORS" are awarded to the upper half of this group; "HONORS" to the lower half. To be eligible for honors, a student must complete at least two years of resident work (60 semester hours) at the University with an average of B (3.0) or higher.

MILTON ABRAMOWITZ MEMORIAL PRIZE IN MATHEMATICS—A prize is awarded annually to a junior or senior student majoring in mathematics who has demonstrated superior competence and promise for future development in the field of mathematics and its applications.

AGRICULTURAL ALUMNI AWARD—Presented to a senior who during his collegiate career contributed most toward the advancement of the College of Agriculture.

ALPHA CHI SIGMA AWARD—The Alpha Rho Chapter of the Alpha Chi Sigma Honorary Fraternity offers annually a year's membership in the American Chemical Society to a senior majoring in Chemistry or Chemical Engineering whose average has been above 3.0 for three and one-half years.

ALPHA LAMBDA DELTA AWARD—Presented to the senior member of the group who has maintained the highest average for three and a half years. She must have been in attendance in the institution for the entire time.

ALPHA LAMBDA DELTA SENIOR CERTIFICATE AWARD—Senior members of Alpha Lambda Delta, honorary scholastic society for women, who have maintained an average of 3.5, receive this certificate.

ALPHA ZETA MEDAL—The Professional Agricultural Fraternity of Alpha Zeta awards annually a medal to the agricultural student in the freshman class who maintains the highest average in academic work.

ALUMNI HAMILTON AWARD—This award is offered by the Engineering Alumni Chapter to the graduating senior in the College of Engineering who has most successfully combined proficiency in his major field of study with achievements—either academic, extra-curricular, or both—in the social sciences or humanities.

AMERICAN ASSOCIATION OF UNIVERSITY WOMEN ANNUAL GRADUATE PRIZE.

AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS AWARD—Free memberships in the Institute for one year and cash prizes for the best paper presented at a Student Branch meeting and for the graduating aeronautical senior with the highest academic standing.

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS AWARD—A certificate, pin and magazine subscription are awarded to the junior member of the Student Chapter who attained the highest overall scholastic average during his freshman and sophomore years.

AMERICAN INSTITUTE OF CHEMISTS AWARD—Presented for outstanding scholarship in chemistry and for high character.

AMERICAN SOCIETY OF CIVIL ENGINEERS AWARD—The Maryland Section of the American Society of Civil Engineers awards annually the first year's dues of an associate membership in the Society to a senior member of the Student Chapter on recommendation of the faculty of the Department of Civil Engineering.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS AWARD—Presented to the Senior member who contributed most to the local chapter.

AMERICAN SOCIETY FOR TESTING MATERIALS—A student membership prize is awarded to an engineering senior in recognition of superior scholastic ability and demonstrated interest in engineering materials and their evaluation.

APPLEMAN-NORTON AWARD IN BOTANY—The Department of Botany offers a scholarship award of $100 in honor of Emeritus Professors C. O. Appleman and J. B. S. Norton to a senior major in Botany who is considered worthy on the basis of demonstrated ability and excellence in scholarship. The scholarship is awarded by the committee on scholarships upon the recommendation of a committee of the faculty of the Department of Botany.

ASSOCIATED WOMEN STUDENTS AWARDS—Presented for outstanding achievement, character, and service to the University.

DINAH BERMAN MEMORIAL MEDAL—The Dinah Berman Memorial Medal is awarded annually to the sophomore who has attained the highest scholastic average of his class in the College of Engineering. This medal is given by Mr Benjamin Berman.

B'NAI B'RITH AWARD—The B'nai B'rith Women of Prince George's County present a Book Award for excellence in Hebrew Studies.

BUSINESS EDUCATION AWARD OF MERIT—To a student in Business Education in recognition of outstanding achievement as a student.

CITIZENSHIP PRIZE FOR MEN—President Emeritus H. C. Byrd of the Class of 1908, annually presents this award to the member of the senior class who, during his collegiate career, has most nearly typified the model citizen and who has done most for the general advancement of the interests of the University.

CITIZENSHIP PRIZE FOR WOMEN—This prize is presented annually as a memorial to Sally Sterling Boyd, by her children, to that member of the senior class who best exemplifies the enduring qualities of the pioneer woman. These qualities typify self dependence, courtesy, aggressiveness, modesty, capacity to achieve objectives, willingness to sacrifice for others, strength of character, and those other qualities that enabled the pioneer woman to play such a fundamental part in the building of the nation.

THE CARROLL E. COX GRADUATE SCHOLARSHIP AWARD IN BOTANY—To the outstanding graduate student in the Department of Botany during the last year.

BERNARD L. CROZIER AWARD—The Maryland Association of Engineers awards a cash prize of twenty-five dollars to the senior in the College of Engineering who, in the opinion of the faculty, has made the greatest improvement in scholarship during his stay at the University.

VIRGINIA DARE AWARD—The Virginia Dare Extract Company awards annually a plaque and $25.00 to the outstanding student in ice cream manufacturing with an overall good standing in dairy science.

THE DANFORTH FOUNDATION AND THE RALSTON PURINA AWARDS—The Danforth Foundation and the Ralston Purina Company of St. Louis offer two summer awards to outstanding men students in the College of Agriculture, one for a student who has successfully completed his junior year, the other for a student who has successfully completed his freshman year. The purpose of these awards is to bring together outstanding young men for leadership training.

The Danforth Foundation and the Ralston Purina Company of St. Louis offer two summer awards to outstanding Home Economics women students, one to a junior and one to a freshman. The purpose of these is to bring together outstanding young women for leadership training.

DELTA DELTA DELTA MEDAL—This sorority awards a medal annually to the woman who attains the highest average in academic work during the sophomore year.

DELTA GAMMA SCHOLARSHIP AWARD—This award is offered to the woman member of the graduating class who has maintained the highest average during three and one-half years at the University.

DELTA SIGMA PI SCHOLARSHIP KEY—This award is offered to a member of the graduating class who has maintained the highest scholastic average for the entire four-year course in the College of Business and Public Administration.

NATHAN L. DRAKE AWARD—Presented by the Alpha Rho Chapter of Alpha Chi Sigma to the most promising student who is majoring in chemistry and has completed the sophomore year.

EDUCATION ALUMNI AWARD—Presented to the outstanding senior man and senior woman in the College of Education.

GENERAL ELECTRIC COMPANY prize to the outstanding first year graduate student in physics and to the outstanding first year graduate student in astronomy.

GODDARD MEDAL—The James Douglass Goddard Memorial Medal is awarded annually to the male resident of Prince George's County born therein, who makes the highest average in his studies and who at the same time embodies the most manly attributes. The medal is given by Mrs. Anne G. Goddard James of Washington, D.C.

CHARLES B. HALE DRAMATIC AWARDS—The University Theatre recognizes annually the man and woman members of the senior class who have done most for the advancement of dramatics at the University.

THE HASKINS AND SELLS FOUNDATIONS, INC. AWARD to the senior student in the College of Business and Public Administration concentrating in accounting who has demonstrated excellent ability in this field of study.

HOME ECONOMICS ALUMNI AWARD—Presented to the female student outstanding in application of home economics in her present living and who shows promise of carrying these into her future home and community.

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERING AWARD—The Washington Section of the Institute of Electrical and Electronics Engineers defrays the expenses of a year's membership as an associate in the institute for the senior doing the most to promote student branch activities.

JOE ELBERT JAMES MEMORIAL AWARD—Gold watch annually awarded to the graduating senior in horticulture on basis of scholarship and promise of future achievement.

LEIDY CHEMICAL COMPANY AWARD to an outstanding student majoring in chemistry.

MARYLAND BANKERS ASSOCIATION SCHOLARSHIP to the Virginia-Maryland Bankers Schools, University of Virginia. Awarded annually to a student majoring in finance in the College of Business and Public Administration.

MARYLAND-DELAWARE PRESS ASSOCIATION ANNUAL CITATION—Presented to the outstanding senior in journalism.

MARYLAND RECREATION AND PARKS SOCIETY AWARD to outstanding senior majoring in recreation.

THE MEN'S LEAGUE AWARD to the male senior who gave the most to sports.

MEN'S LEAGUE CERTIFICATES—Offered for outstanding achievement, character and service to the University.

MEN'S LEAGUE CUP—This award is offered by the Men's League to the graduating male senior who has done the most for the male student body.

MOTOR FLEET SUPERVISORS AWARD to a student majoring in transportation in the College of Business and Public Administration.

NATIONAL SOCIETY OF FIRE PROTECTION ENGINEERS AWARDS—Presented to the most outstanding senior and sophomore in the fire protection curriculum.

NOXZEMA CHEMICAL COMPANY SCHOLARSHIP AWARD to an undergraduate student in chemistry.

OMICRON NU SORORITY MEDAL—This honorary sorority awards a medal annually to the freshman woman in the College of Home Economics who attains the highest scholastic average during the first semester.

PHI BETA KAPPA JUNIOR AWARD—An award to be presented to the junior initiate into Phi Beta Kappa who has attained the highest academic average.

PHI BETA KAPPA—LEON P. SMITH AWARD—The award of the Gamma of Maryland Chapter of Phi Beta Kappa is presented to the graduating senior with the highest cumulative scholastic average whose basic course program has been in the liberal studies.

PHI CHI THETA KEY—The Phi Chi Theta Key is awarded to the outstanding graduating senior woman in the College of Business and Public Administration on the basis of scholarship, activities and leadership.

PHI SIGMA AWARDS for outstanding achievement in the biological sciences to an undergraduate student and a graduate student.

PI DELTA EPSILON NATIONAL MEDAL OF MERIT AWARDS—Offered by the National Council of Pi Delta Epsilon to the outstanding senior woman and the outstanding senior man in journalism activities.

PI DELTA EPSILON AWARD for outstanding service to communications in the field of broadcasting.

PI DELTA EPSILON AWARD for outstanding service to communications in the field of business.

PI DELTA EPSILON AWARD to the outstanding freshman in the field of communications.

PI DELTA EPSILON AWARD for outstanding service to communications in the field of editorial journalism.

PI TAU SIGMA AWARD—An annual handbook award to the most outstanding sophomore in mechanical engineering on the basis of scholastic average and instructors' ratings.

PILOT FREIGHT CARRIERS, INC. AWARD to the senior student in the College of Business and Public Administration who has majored in transportation and who has demonstrated competence in this field of study.

PUBLIC RELATIONS SOCIETY OF AMERICA—The Baltimore Chapter of PRSA presents an annual citation to the outstanding senior majoring in public relations.

SIGMA ALPHA OMICRON AWARD—This award is presented to a senior student majoring in microbiology for high scholarship, character and leadership.

THE SIGMA CHAPTER, PHI DELTA GAMMA AWARD To an outstanding woman who has completed requirements for the doctoral degree.

DR. LEO AND RITA SKLAR GENERAL HONORS AWARDS —Dr. Leo Sklar, A&S '37, and his wife, Rita Sklar, annually fund four awards for excellence in the General Honors Program of the College of Arts and Sciences. These awards are given to the Outstanding Student in the General Honors Program ($400), the Outstanding General Honors senior ($300), the Outstanding General Honors junior ($300), and the Outstanding General Honors sophomore ($300).

ALGERNON SYDNEY SULLIVAN AWARD—The New York Southern Society, in memory of its first president, awards annually medallions and certificates to one man and one woman of the graduating class and one non-student who evince in their daily life a spirit of love for and helpfulness to other men and women.

TAU BETA PI AWARD—The Maryland Beta Chapter of Tau Beta Pi Association, national engineering honor society, awards an engineer's handbook to the junior in the College of Engineering who during his sophomore year has made the greatest improvement in scholarship over that of his freshman year.

THE HOMER ULRICH AWARD—The Homer Ulrich Honors Awards in Performance are presented each spring in honor of Homer Ulrich, Professor Emeritus and former Chairman of the Music Department. Three undergraduate and three graduate performers are selected in a departmental competition to appear in a specially designated honors recital and to receive an honorarium.

WALL STREET JOURNAL STUDENT ACHIEVEMENT AWARD—Awarded annually to the graduating senior who has maintained the highest scholastic achievement in the field of financial administration. The award consists of a silver medal embedded in clear plastic and one year's subscription to the Wall Street Journal.

AIR FORCE ROTC AWARDS

AEROSPACE EDUCATION FOUNDATION.

W. RANDOLPH LOVELACE MEMORIAL AWARD recognizes the most outstanding Air Force Association Award winner from each of the nine geographical areas.

AFROTC ANGEL FLIGHT AWARD to the outstanding freshman cadet displaying outstanding leadership and showing the most promise for the Professional Officer Course.

AIR COMMAND AND STAFF COLLEGE AWARD recognizes the most outstanding AFROTC cadet in the nation for his military and scholastic excellence.

AIR FORCE TIMES AWARD to the senior cadet at each detachment who has distinguished himself by contributing materially to constructive public attention for the corps of cadets.

ALUMNI CUP offered each year to the cadet who has achieved the highest grade point average within the corps of cadets.

AMERICAN FIGHTER ACES AWARD recognizes the outstanding graduating cadet pilot in each geographical area based on his performance and achievements as an AFROTC cadet and his performance in the Flight Instruction Program.

AMERICAN LEGION AWARDS to outstanding senior and junior cadets who have demonstrated military excellence and scholastic achievement.

ARMED FORCES COMMUNICATIONS AND ELECTRONICS ASSOCIATION to the outstanding senior cadet majoring in electrical, electronics or communications engineering.

ARMED FORCES COMMUNICATIONS AND ELECTRONICS ASSOCIATION SCHOLARSHIP AWARD of one $500 scholarship annually to a sophomore AFROTC cadet for undergraduate or University study in electrical engineering, communications engineering and/or technical photography.

ARNOLD AIR SOCIETY AWARD to the advanced cadet selected by the Arnold Air Society as the cadet who has contributed the most to the advancement of AFROTC through activities of the Arnold Air Society.

COBLENTZ MEMORIAL CUP to the outstanding flight in the corps of cadets, by the Board of Regents of the University.

DAUGHTERS OF THE AMERICAN REVOLUTION AWARD recognizes the senior cadet displaying qualities of dependability and good character, adherence to military discipline, leadership ability and a fundamental, patriotic understanding of the importance of ROTC training.

DISABLED AMERICAN VETERANS GOLD CUP to the senior cadet who has displayed outstanding leadership, scholarship and citizenship.

DISTINGUISHED AFROTC CADET AWARDS to those seniors who possess outstanding qualities of leadership and high moral character and who meet the prescribed standings in their academic and military studies.

GENERAL DYNAMICS AWARD to the sophomore cadet displaying outstanding leadership and scholarship qualities and who has been selected for the Professional Officer Course.

GOVERNOR'S CUP to the outstanding squadron in the corps of cadets.

LEGION OF VALOR BRONZE CROSS OF ACHIEVEMENT AWARD recognizes one cadet from each geographical area for his performance and achievements as an AFROTC cadet.

NATIONAL DEFENSE TRANSPORTATION ASSOCIATION AWARD to the outstanding senior cadet majoring in transportation.

RESERVE OFFICERS ASSOCIATION AWARDS to the outstanding senior, junior and sophomore cadets at each detachment.

SOCIETY OF AMERICAN MILITARY ENGINEERS AWARD to recognize 20 junior or senior cadets nationally displaying outstanding scholastic achievement and leadership and majoring in the field of engineering

SONS OF THE AMERICAN REVOLUTION MEDALS to a two-year and a four-year cadet displaying outstanding aptitude for the military.

ATHLETIC AWARDS

ATLANTIC COAST CONFERENCE AWARD—A plaque is awarded each year to a senior in each conference school for excellence in scholarship and athletics.

THE ALVIN L. AUBINOE BASKETBALL TROPHY—This trophy is offered by Alvin L. Aubinoe for the senior who has contributed most to the squad.

THE ALVIN L. AUBINOE FOOTBALL TROPHY—This trophy is offered by Alvin L. Aubinoe for the unsung hero of the current season.

THE ALVIN L. AUBINOE TRACK TROPHY—This trophy is offered by Alvin L. Aubinoe for the senior who has contributed most to the squad during the time he was on the squad.

BOB BEALL-TOMMY MARCOS TROPHY—This trophy is awarded to the best football lineman of the year.

JOHN T. BELL SWIMMING AWARD—To the year's outstanding swimmer or diver.

LOUIS W. BERGER TROPHY—Presented to the outstanding senior baseball player.

ANDREW M. COHEN TENNIS TROPHY—This trophy is awarded to the member of the tennis team who, judged by his teammates, contributed the most to tennis.

WILLIAM P. COLE, III, MEMORIAL LACROSSE AWARD—This award, offered by the teammates of William P. Cole, III, and the coaches of the 1940 National Champion team, is presented to the outstanding midfielder.

THE GEORGE C. COOK MEMORIAL SCHOLARSHIP TROPHY—Awarded annually to a member of the football team with the highest scholastic average.

JOE DECKMAN-SAM SILBER TROPHY—This trophy is offered by Joseph H. Deckman and Samuel L. Silber to the most improved defense lacrosse player.

GEARY F. EPPLEY AWARD—Offered by Benny and Hotsy Alperstein to the graduating male senior athlete who, during his three years of varsity competition, lettered at least once and attained the highest over-all scholastic average.

HALBERT K. EVANS MEMORIAL TRACK AWARD—This award, given in memory of "Hermie" Evans, of the Class of 1940, by his friends, is presented to a graduating senior trackman.

JACK FABER-AL HEAGY UNSUNG HERO AWARD—Presented to the player who best exemplifies determination, will to win, and pride in accomplishment.

HERBERT H. GOODMAN MEMORIAL TROPHY—This trophy is awarded to the most outstanding wrestler of the year.

JIM KEHOE RING AWARD—A Maryland Ring is awarded to the member of the track team whose dedication to excellence most closely exemplifies that of Jim Kehoe, one of Maryland's greatest trackmen.

CHARLES LEROY MACKERT TROPHY—This trophy is offered by William K. Krouse to the Maryland student who has contributed most to wrestling while at the University.

MARYLAND RING—The Maryland Ring is offered as a memorial to Charles L. Linhardt, of the Class of 1912, to the Maryland man who is adjudged the best athlete of the year.

CHARLES P. MCCORMICK TROPHY—This trophy is offered by Charles P. McCormick to the senior letterman who has contributed most to swimming during his collegiate career.

EDWIN POWELL TROPHY—This trophy is offered by the Class of 1913 to the player who has rendered the greatest service to lacrosse during the year.

SILVESTER WATCH FOR EXCELLENCE IN ATHLETICS—A gold watch, given in honor of former President of the University, R. W. Silvester, is offered annually to "the man who typifies the best in college athletics."

TEKE TROPHY—This trophy is offered by the Maryland Chapter of Tau Kappa Epsilon Fraternity to the student who during his four years at the University has rendered the greatest service to football.

ROBERT E. THEOFELD MEMORIAL—This trophy is presented by Dr. and Mrs. Harry S. Hoffman and is awarded to the golfer who most nearly exemplifies the competitive spirit and strong character of Robert E. Theofeld, a former member of the boxing team.

THE DR. REGINALD VAN THUMP TRUITT AWARD—This award is given to a senior attackman in lacrosse (midfield or attack) for scholastic attainments and team performance.

UNIVERSITY OF MARYLAND ALUMNI SWIMMING ASSOCIATION SCHOLAR ATHLETE AWARD—This award is given to the swimmer who has compiled the best combination academic and aquatic record.

MUSIC AWARDS

ASSISTANT DIRECTOR'S AWARD to the outstanding member of the Symphonic Band.

DIRECTOR'S AWARD to the concert band member who demonstrated the most improvement in musicianship during the year.

KAPPA KAPPA PSI AWARD to the most outstanding band member of the year.

SIGMA ALPHA IOTA ALUMNAE AWARD for outstanding musical performance.

SIGMA ALPHA IOTA DEAN'S HONOR AWARD for service and dedication.

SIGMA ALPHA IOTA HONOR CERTIFICATE to the senior with the highest scholastic average.

SIGMA ALPHA IOTA LEADERSHIP AWARD based on personality, student activities, fraternity service, and scholarship.

TAU BETA SIGMA AWARD to the outstanding band sorority member of the year.

Awards are presented to the members of the University Bands, the University Orchestras, and the Men's and Women's Glee Clubs who serve faithfully throughout the year.

STUDENT GOVERNMENT AWARDS

Keys are awarded to the members of the SGA Legislature and Certificates of Appreciation to the members of the Cabinet.

ACADEMIC REGULATIONS

GENERAL UNIVERSITY REQUIREMENTS

In order to provide educational breadth for all students, there has been established the General University Requirements. These requirements consist of 30 semester hours of credit distributed among the three areas listed below. (For an exception to this regulation, see the Bachelor of General Studies Program.) At least 6 hours must be taken in each area. At least 9 of the 30 hours must be taken at the 300 level or above. None of the 30 hours may be counted toward published departmental, college or divisional requirements for a degree.

Area A. 6-12 hours elected in the Divisions of Life Sciences and Agriculture; Mathematical, Physical and Engineering Sciences.

Area B. 6-12 hours in the Divisions of Behavioral and Social Sciences; Human and Community Resources.

Area C. 6-12 hours in the Division of Arts and Humanities. Unless the student has been exempted from English composition, at least one course in this subject will be required. Exemption is granted by an acceptable score on the SAT Verbal test (score announced annually), or by a score of 2 on the English Advanced Placement test, or by satisfactory completion of a similar course at another institution. Students taking a course to satisfy this requirement may include that course within the 30 hour General University Requirement but may not count it toward the satisfaction of the minimum 6 hour requirement in any of the three designated areas. In meeting these area requirements students

may choose from among any undergraduate courses for which they are qualified. The student may select either the pass-fail or letter grading option for these courses as outlined on pages 25-26. Students are urged to consult with academic advisors for guidance in determining which courses in each area best fit individual needs and interests.

Special note for foreign students

The foreign student is required to take a special classification test in English before registering for the required English courses. He may be required to take Foreign Language 001 and 002—English for Foreign Students—*before* registering for English 101.

AIR FORCE AEROSPACE STUDIES

The Air Force ROTC program provides preprofessional education for future Air Force commissioned officers. Courses are offered as electives, and enable college men and women to earn a commission in the United States Air Force while completing their University degree requirements. In addition, all AFROTC students are eligible for draft deferments.

TWO PROGRAMS OFFERED

Four-Year Program

A General Military Course (GMC) is normally for freshmen and sophomores. Those who successfully complete the GMC may apply for the Professional Officer Course (POC) which is the final two years of AFROTC. Progression into the POC is not automatic but is limited to selected students only. Students in the four-year program must attend four weeks of field training at a designated Air Force base during the summer after completing the sophomore year of college. To enter the AFROTC program, one should inform his advisor and register for it in the same manner as for other courses.

Two-Year Program

The Professional Officer Course (POC) is normally offered in the junior and senior years, but may be taken by graduate students otherwise qualified. This program is especially attractive for those unable to take the four-year program, particularly transfer students. Evaluation of candidates is normally begun during the first semester of the sophomore year, since each student must meet physical and mental standards set by the Air Force. Interested students should contact the Professor of Air Science as early in their sophomore year as possible. Students in the two-year program must attend six weeks of field training at a designed Air Force base during the summer preceding initial entry into the two-year academic portion. The academic program for the last two years (POC) is identical with the final two years of the four-year program.

The Curriculum:

General Military Course—freshman year, ARSC 100 and ARSC 101; sophomore year, ARSC 200 and ARSC 201. In the first two years, cadets meet academic classes once per week. In addition, they receive one hour of Corps Training each week.

Professional Officer Course—junior year, ARSC 300 and ARSC 301; senior year, ARSC 302 and ARSC 303. The courses for the junior and senior years of Aerospace Power" and "Air Force Leadership and Management" respectively. They require three class hours, plus one hour of Corps Training per week.

The AFROTC College Scholarship Program provides scholarships for selected cadets each year in the AFROTC program. Those selected receive money for tuition, laboratory expense, incidental fees, and books for up to eight semesters. In addition, they receive nontaxable pay.

All students in the two-year and four-year program enrolled in the Professional Officer Course but not receiving full scholarships will receive monthly pay for the two-year period. Students also receive nominal pay (plus quarters and subsistence) while attending either the four-week or the six-week Field Training Session.

To be accepted into the Professional Officer Course the student must: complete the General Military Course and a four-week Field Training Session, or the six-week Field Training Session; pass the Air Force Officer Qualification Test; be physically qualified; enlist in the Air Force Reserve; be in good academic standing; meet age requirements; possess the necessary qualities of leadership and citizenship. Successful completion of the Professional Officer Course and a bachelor's degree are the prerequisites for a commission as a second lieutenant in the United States Air Force.

Students who have prior military service or ROTC training with the Army, Navy, Marine Corps, Coast Guard, or Air Force will be evaluated and allowed appropriate credit toward meeting the requirements for the General Military (Basic) Course. Professional Officer Course (Advanced) credits are transferable.

Attendance at air science classes is mandatory. Excuses for class or drill absences will not be recognized except in case of sickness, emergencies, or University business covered by University excuses. All unexcused absences operate to reduce the term grade. Excessive absences and/or misconduct will be cause for dismissal.

Qualified seniors who elect to become Air Force pilots receive a free 36½-hour flight instruction program. Cadets are instructed by competent civilian instructors. This training enables them to

earn their private pilot's license before graduating from college.

REGISTRATION

1. To attend classes at the University of Maryland it is necessary to process an official registration. Registration is final and official when all fees are paid. Instructions concerning registration are given in the Schedule of Classes issued at the beginning of each new semester.

2. The schedule adjustment period shall be the first 10 days of classes. During that period, the student may drop or add courses and sections with no charge. Courses dropped during this period will be made available to other students desiring to add. Courses so dropped during this registration period will *not* appear on the student's permanent record. Courses may be added, where space is available, during this period and will appear on the student's permanent record along with other courses previously listed. After this schedule adjustment period, courses may not be added without special permission of the instructor and the Dean or Divisional Officer of the academic unit in which the course is being offered.

3. After this schedule adjustment period, all courses for which the student is enrolled (or subsequently adds) shall remain as a part of the student's permanent record. The student's status shall be considered as *full-time* if the number of credit hours enrolled *at this time* is 9 or more. Courses may be dropped with no academic penalty for a total period of 10 weeks in which there are classes. The permanent record will be marked *W* to indicate this. (See MARKING SYSTEM below.) After this initial schedule adjustment period a charge shall be made for each course dropped or added. (See SCHEDULE OF FEES above.)

4. An official class list for each course being offered is issued each semester to the appropriate department by the Office of Registrations. No student is permitted to attend a class if his name does not appear on the class list. Instructors must report discrepancies to the Office of Registrations. At the end of the semester, the Office of Registrations issues to each department official grade cards. The instructors mark the final grades on the grade cards, sign the cards and return them to the Office of Registrations.

5. Courses taken at another campus of the University of at another institution concurrent with regular registration on the College Park Campus may not be credited without approval in advance by the Divisional Officer of the Division from which the student expects a degree. The same rule applies to off-Campus registration or registrations in the summer school of another institution.

6. A student who is eligible to remain at the College Park Campus may transfer among curricula, colleges, divisions, or other academic units except where limitations on enrollments have been approved by the Board of Regents.

7. In all cases of transfer from one division to another on the College Park Campus, the Divisional Officer of the receiving division, with the approval of the student, shall indicate which courses, if any, in the student's previous academic program are not applicable to his new program, and shall notify the Office of Registrations of the adjustments which are to be made in determining the student's progress toward a degree. Deletions may occur both in credits attempted and correspondingly in credits earned. This evaluation shall be made upon the student's initial entry into a new program, not thereafter. If a student transfers within one division from one program to another, his record evaluation shall be made by the Divisional Officer in the same way as if he were transferring divisions. If the student subsequently transfers to a third division, the Divisional Officer of the third division shall make a similar initial adjustment; courses marked "nonapplicable" by the second Divisional Officer may become applicable in the third program.

8. In the cases of non-divisional students, the Dean for Undergraduate Studies shall assume the responsibilities normally delegated to Divisional Officers.

DEGREES AND CERTIFICATES

The University confers the following degrees: Bachelor of Arts, Bachelor of General Studies, Bachelor of Music, Bachelor of Science, Bachelor of Science in Nursing, Bachelor of Science in Pharmacy, Bachelor of Architecture, Master of Arts, Master of Arts in American Civilization, Master of Business Administration, Master of Education, Master of Music, Master of Science, Master of Library Science, Master of Social Work, Doctor of Dental Surgery, Doctor of Education, Doctor of Medicine, Doctor of Philosophy, Doctor of Musical Arts, Doctor of Business Administration, and Juris Doctor.

Students in specified two-year curricula may be awarded certificates.

No baccalaureate degree will be awarded to a student who has had less than one year of resident work in this University. The last thirty semester credits in any curricula leading to a baccalaureate degree must be taken in residence at the University. Candidates for the baccalaureate degree in combined curricula at College Park and Baltimore must complete a minimum of thirty semester credits at College Park.

The requirements for graduation vary according to the character of work in the different colleges and schools. Full information regarding specific college requirements for graduation will be found in the College Section of this catalog.

Each candidate for a degree or certificate must file a formal application for it with the Registra-

tions Office. This must be done by the end of the third week of the semester or the second week of the summer session at the end of which he expects to graduate.

CREDIT UNIT AND LOAD

The semester hour, which is the unit of credit, is the equivalent of a subject pursued one period a week for one semester. Two or three periods of laboratory or field work are equivalent to one lecture or recitation period. The student is expected to devote three hours a week in classroom or laboratory or in outside preparation for each credit hour in any course.

In order for an undergraduate student to complete most curricula in the designated amount of time, his semester credit load must range from 12 to 19 hours, so that he would complete from 30 to 36 hours each year toward his degree. A student registering for less than 12 hours or more than 19 hours per semester must have the special approval of his Dean or Divisional Officer.*

*The following semester course loads are considered full-time in their respective areas: Acedemic Probation Plan, 7 s.h.; Physical Education Requirement, 9 s.h.; Tuition and Fee Assessment, 9 s.h.; Housing, 12 s.h.; Plan of Minimum Requirements For Graduation, 12 s.h.; Foreign Students, 12 s.h.; and Teacher Tuition Remission, 15 s.h. Athletes need 24 s.h. a year.

EXAMINATIONS

1. A final examination shall be given in every undergraduate course. Exceptions may be made with the approval of the chairman of the department and the dean. In order to avoid basing too much of the semester grade upon the final examination, additional tests, quizzes, term papers, reports and the like should be used to determine a students comprehension of a course. The order of procedure in these matters is left to the discretion of departments or professors and should be announced to a class at the beginning of a course. All final examinations must be held on the examination days of the Official Final Examination Schedule. No final examination shall be given at a time other than that scheduled in the Official Examination Schedule without written permission of the department chairman.

2. To expedite arrangements for commencement, final grades of undergraduate candidates for degrees are based on evaluations available at the time grades are required to be submitted.

3. A file of all final examination questions must be kept by the chairman of each department.

4. The chairman of each department is responsible for the adequate administration of examinations in courses under his jurisdiction. The deans should present for consideration the matter of examinations in staff conferences from time to time and investigate examination procedures in their respective colleges.

5. Every examination shall be designed to require for its completion not more than the regularly scheduled period.

6. A typewritten, mimeographed or printed set of questions shall be placed in the hands of every examinee in every test or examination requiring at least one period, unless the dean of the college has authorized some other procedure.

7. Each instructor must safeguard his examination questions and all trial sheets, drafts and stencils.

8. Each instructor should avoid the use of examination questions which have been included in recently given examinations and should prepare examinations that will make dishonesty difficult.

9. Only clerical help approved by the department chairman shall be employed in the preparation or reproduction of tests or examination questions.

10. Proctors must be in the examination room at least ten minutes before the hour of a final examination. Provisions should be made for proper ventilation, lighting and a seating plan. At least one of the proctors present must be sufficiently cognizant of the subject matter of the examination to deal authoritatively with inquires arising from the examination.

11. Books, papers, etc., belonging to the student, must be left in a place designated by the instructor before the student takes his seat, except in such cases where books or work sheets are permitted.

12. Students should be seated at least every other seat apart, or its equivalent, i.e., about three feet. Where this arrangement is not possible some means must be provided to protect the integrity of the examination.

13. "Blue books" only must be used in periodic or final examinations, unless special forms are furnished by the department concerned.

14. If mathematical tables are required in an examination, they shall be furnished by the instructor. If textbooks are used, this rule does not apply.

15. Proctors must exercise all diligence to prevent dishonesty and to enforce proper examination decorum, including abstention from smoking.

16. Where an instructor must proctor more than 40 students, he should consult the chairman of his department concerning proctorial assistance. An instructor should consult his department chairman if in his opinion a smaller number of students for an examination requires the help of another instructor.

17. No student who leaves an examination room will be permitted to return, except in unusual circumstances, in which case permission to do so must be granted by the proctor prior to the student's departure.

18. All conversation will cease prior to the pass-

ing out of examination papers, and silence will be maintained in the room during the entire examination period.

19. Examination papers will be placed face down on the writing desks until the examination is officially begun by the proctor.

20. Examination papers will be kept flat on the writing desk at all times.

IRREGULARITIES IN EXAMINATIONS

1. In cases involving charges of academic irregularities or dishonesty in an examination, class work or course requirements by an undergraduate student, the instructor in the course shall report to his instructional department chairman any information received and the facts within his knowledge. If the chairman of the instructional department determines that there is any sound reason for believing that academic dishonesty may be involved, he shall refer the matter to the dean of the college or school. The dean will then confer with the dean of the student's college or school and will check the Judiciary Office records to determine if the student has any record of prior offenses involving academic dishonesty. The dean will then consult with the student involved, and if the alleged academic dishonesty is admitted by the student and is his first offense of this nature, the dean may authorize the department chairman to dispose of the charges, limiting the maximum penalty to disciplinary probation and a grade of F in the course, provided the penalty is accepted by the student in writing. In such case the department chairman will make a written report of the matter, including the action taken, to the dean of the student's college or school and to the Judiciary Office.

If the case is not disposed of in the above manner, the dean of the instructional department will appoint an *ad hoc* Committee on Academic Dishonesty consisting of one member from the faculty of the college or school administered by the dean as chairman, one undergraduate student, and one member from the faculty of the student's college or school appointed by the dean of that college or school. If the student's dean and the dean administering the instructional department are the same, a second member of the faculty of the college or school concerned is appointed.

The dean of the instructional department will refer the specific report of alleged academic dishonesty to this *ad hoc* committee and the committee will hear the case. The hearing procedures before this committee will in general conform to those required for student judicial boards. The committee may impose the normal disciplinary actions and/or impose a grade of F in the course.

The chairman of the committee will report its actions to the dean of the student's college or school and to the Judiciary Office. The dean of the instructional department will advise the student in writing of the disciplinary action of the committee, and also advise him of his right to file an appeal to the Adjunct Committee on Student Conduct.

The student may file his appeal in accordance with the normal procedures to the Adjunct Committee with the dean of the instructional department and the latter will forward it to the chairman of the Adjunct Committee. The chairman of the Adjunct Committee will notify the student in writing of the time, date, and place of the hearing.

2. In cases involving charges of academic irregularities or dishonesty in an examination, class work or course requirements by a graduate student, the above procedure will be followed except that:

a. The chairman of the instructional department will refer the matter to the Dean for Graduate Studies and Research.

b. The *ad hoc* Committee on Academic Dishonesty will be appointed by the Dean for Graduate Studies and Research and will consist of two members of the Graduate School faculty, one serving as chairman and one graduate student.

MARKING SYSTEM

1. The following symbols are used on the student's permanent record for all courses in which he is enrolled after the initial registration and schedule adjustment period: A, B, C, D, F, I, P, S, and W. These marks remain as part of the student's permanent record and may only be changed by the original instructor on certification, approved by the department chairman and Divisional Officer, that an actual mistake was made in determining or recording the grade.

2. The *mark of A* denotes excellent mastery of the subject. It denotes outstanding scholarship. In computations of cumulative or semester averages, a mark of A will be assigned a value of 4 quality points per credit hour. (See MINIMUM REQUIREMENTS FOR RETENTION AND GRADUATION below.)

3. The *mark of B* denotes good mastery of the subject. It denotes good scholarship. In computation of cumulative or semester averages a mark of B will be assigned 3 quality points per credit hour.

4. The *mark of* C denotes acceptable mastery. It denotes the usual achievement expected. In computation of cumulative or semester averages a mark of C will be assigned a value of 2 quality points per credit hour.

5. The *mark of D* denotes borderline understanding of the subject. It denotes marginal performance, and it *does not represent satisfactory progress toward a degree.* In computations of cumulative or semester averages a mark of D will be assigned a value of 1 quality point per credit hour.

6. The *mark of F* denotes failure to under-

stand the subject. It denotes unsatisfactory performance. In computations of cumulative or semester averages a mark of F will be assigned a value of 0 quality points per credit hour.

7. The *mark of P* is a student option mark, equivalent to A, B, C, or D. (See PASS-FAIL option below.) The student must inform the Office of Registrations of his selection of this option by the end of the schedule adjustment period. In computation of cumulative averages a mark of P will not be included. In computation of quality points achieved *for a semester*, a mark of P will be assigned a value of 2 quality points per credit hour. (See MINIMUM REQUIREMENTS FOR RETENTION AND GRADUATION below.)

8. The *mark of S* is a department option mark which may be used to denote satisfactory participation by a student in progressing thesis projects, orientation courses, practice teaching and the like. In computation of cumulative averages a mark of S will not be included. In computation of quality points achieved for a *semester*, a mark of S will be assigned a value of 2 quality points per credit hour.

9. The *mark I* is an exceptional mark which is an instructor option. It is given only to a student whose work in a course has been qualitatively satisfactory, when, because of illness or other circumstances beyond his control, he has been unable to complete some small portion of the work of the course. In no case will the mark I be recorded for a student who has not completed the major portion of the work of the course. The student will remove the I by completing work assigned by the instructor; it is the student's responsibility to request arrangements for completion of the work. The work must be completed by the end of the next semester in which the course is again offered and in which the student is in attendance at the College Park Campus; otherwise the I becomes terminal (equivalent to W). Exceptions to the time period cited above may be granted by the student's Dean or Divisional Officer upon the written request of the student if circumstances warrant further delay. If the instructor is unavailable, the department chairman will, upon request of the student make appropriate arrangements for the student to complete the course requirements. It is the responsibility of the instructor or department chairman concerned to return the appropriate supplementary grade report to the Office of Registrations promptly upon completion of the work. The I cannot be removed through reregistration for the course or through the technique of "credit by examination." In any event this mark shall not be used in any computations.

10. The *mark W* is used to denote that the student withdrew from a course in which he was enrolled at the end of the schedule adjustment period. This mark shall not be used in any computation, but for information and completeness is placed on the permanent record by the Office of Registrations. The Office of Registrations will promptly notify the instructor that the student has withdrawn from the course.

11. *Audit.* A student may register to audit a course or courses in which space is available. The notation *AUD* will be placed on his transcript for each course audited. A notation to the effect that this symbol does not imply attendance or any other effort in the course will be included on the transcript in the explanation of the grading system.

PASS-FAIL OPTION

1. An undergraduate who has completed 15 or more credit hours at the College Park Campus and has a cumulative average of at least 2.00 may register for courses on the PASS-FAIL option during any semester or summer session.

2. Certain divisional requirements, major requirements or field of concentration requirements do not allow the use of the PASS-FAIL option. Certain courses within a department may be designated by that department as not available under the PASS-FAIL option. It is the responsibility of each student electing this option to ascertain in conjunction with his Divisional Officer, Dean, department or major advisor, whether the particular courses will be applicable to his degree requirements under the PASS-FAIL option.

3. No more than 20 percent of the credits offered toward the degree may be taken on the PASS-FAIL option basis.

4. Students registering for a course under the PASS-FAIL option are required to complete all regular course requirements. Their work will be evaluated by the instructor by the normal procedure for letter grades. The instructor will submit the normal grade. The grades A, B, C, or D will be automatically converted by the Office of Registrations to the grade *P* on the student's permanent record. The grade *F* will remain as given. The choice of grading option may be changed only during the schedule adjustment period for courses in which the student is currently registered.

CREDIT BY EXAMINATION FOR UNDERGRADUATE STUDIES

1. The applicant must be a registered student at the University of Maryland. Part-time students must be enrolled in course work carrying at least three semester hours of credit.

2. The total amount of credit that can be established by examination cannot exceed 30 semester credits, nor may it be part of the final 15 semester credits of the student's program. "Credit by examination" cannot be given for a course in which the student has a grade of "I" outstanding.

3. A grade of D or higher must be obtained in order to establish credit by examination. Letter grades, including F's earned on examinations to establish credit will be entered on the student's

transcript and used in computing his cumulative grade point average. Such credits shall be followed by the phrase "By Exam" or "By CLEP Exam," whichever is applicable. A student may elect to take an examination for credit on a "Pass-Fail" basis under the normal "Pass-Fail" regulations.

4. Approval to take an examination in any course will depend on the student's having received approval of his Academic Adviser, the Chairman of the Department offering the course and the Dean of the College in which the student is enrolled.

5. The instructor must certify on the report of the examination submitted to the Registrations Office that copies of the examination questions or identifying information in the case of standardized examinations, and the student's answers have been filed with Chairman of the Department offering the course.

JUNIOR STANDING

1. A student is permitted to register for upper division courses when granted Junior Standing by his college. This permission shall be based upon earning a minimum of 56 academic hours toward his degree, completing such course requirements as the college may direct, and possessing the minimum required grade point average to remain in the University.

2. Exceptional students having completed forty-eight (48) semester hours of academic credits and having the approval of the department involved will be permitted to enroll for sufficient upper division courses to complete a normal program. That is, such students must carry lower division courses to total fifty-six (56) semester hours of academic credits and the remainder may be in courses numbered in the 300-499 range.

DEGREE REQUIREMENTS

1. It is the responsibility of departments, colleges, divisions, or appropriate academic units to establish and publish clearly defined degree requirements. Responsibility for knowing and meeting all degree requirements for graduation in any curriculum rests with the student. Not later than the close of his junior year, the student should check with the proper authorities to ascertain his standing in this respect. For this purpose the student should be sure to preserve the copy of the semester grade report issued by the Office of Registrations at the close of each semester.

2. In order to earn a baccalaureate degree the last 30 semester credits of any curriculum must be taken in residence at the College Park Campus. Candidates for degrees in pre-professional combined programs must complete at least 30 semester credits at College Park. The minimum residence required for a baccalaureate degree is 30 semester hours; nothing stated below modifies in any way this basic requirement. Included in these 30 semester hours will be a minimum of 15 semester hours in courses numbered 300 or above, including at least 12 semester hours required in the major field (in curricula requiring such concentration). All candidates for degrees should plan to take their senior year in residence since the advanced work of the major study normally occurs in the last year of the undergraduate course. At least 24 of the last 30 credits must be done in residence at the College Park Campus; *i.e.*, a student who at the time of his graduation will have completed 30 semester hours in residence may be permitted to do not more than 6 semester hours of his final 30 credits of record in another institution, provided that he secures in advance written permission from his Dean or Divisional Officer. The student must be enrolled in the program from which he plans to graduate when registering for the last 15 credits of his program. These requirements apply also to the third year of pre-professional combined degree programs.

3. While many University curricula require more semester hours than 120, no baccalaureate curriculum requires less than 120 credit hours. It is the student's responsibility to familiarize himself with the requirements of his curriculum. The student is urged to avail himself of the advice on these matters in the departments, colleges, divisions, or Office of Academic Affairs. A student who wishes to earn a second baccalaureate degree in the University is required to complete the additional studies regularly prescribed for that degree, involving at least one year's additional residence and the earning of at least 30 additional credits.

4. A general C (2.00) average is required for graduation in all curricula. (See MINIMUM REQUIREMENTS FOR RETENTION AND GRADUATION.)

5. Application for diplomas must be filed with the Office of Registrations during the registration period or not later than the end of the second week of classes of the regular semester or at the end of the second week of the summer session, at the end of which the candidate expects to receive his degree. Applications filed after the third week of classes of a regular semester or Friday of the second week of a summer session will be retained until the next semester (session) when degrees will be awarded.

ATTENDANCE

1. The University expects each student to take full responsibility for his academic work and academic progress. The student, to progress satisfactorily, must meet the quantitative and qualitative requirements of each course for which he is registered. Students are expected to attend classes regularly, for consistent attendance offers the most effective opportunity open to all students to gain a developing command of the concepts and materials of their course of study. However, at-

tendance in class, in and of itself, is not a criterion for the evaluation of the student's degree of success or failure. Furthermore, absences (whether excused or unexcused) do not alter what is expected of the student qualitatively and quantitatively. Except as provided below, absences will not be used in the computation of grades, and the recording of student absences will not be required of the faculty.

2. In certain courses in-class participation is an integral part of the work of the course. A few examples would be courses in public speaking and group discussion, courses emphasizing conversation in foreign languages, certain courses in physical education, and certain laboratory sessions. Each department shall determine which of its courses fall in this category. It shall be the responsibility of the instructor in such courses to inform each class at the beginning of the semester that in-class participation is an integral part of the work of the course and that his absences will be taken into account in the evaluation of his work in the course.

3. Laboratory meetings require special preparation of equipment and materials by the staff. A student who is not present for a laboratory exercise has missed that part of the course and cannot expect that he will be given an opportunity to make up this work later in the term.

4. Special provision for freshmen: the freshman year is a transitional year. Absences of freshmen in the basic freshman courses will be reported to the student's dean when the student has accumulated more than three unexcused absences.

5. Excuses for absences (in basic freshman courses and in courses where in-class participation is a significant part of the work of the course) will be handled by the instructor in the course in accordance with the general policy of his department and college.

6. Examination and tests: it is the responsibility of the student to keep himself informed concerning the dates of announced quizzes, tests and examinations. An instructor is not under obligation to give a student a make-up examination unless the student can present evidence that his absence was caused by illness or by participating in University activities at the request of University authorities. A make-up examination, when permitted, is given at the convenience of the instructor, but must not interfere with the student's regularly scheduled classes.

SCHOLARSHIP HONORS

Honors for excellence in scholarship are awarded to not more than one-fifth of the graduation class in each college. (The computation does not include grades for courses taken during the last semester of registration before graduation.) "High Honors" are awarded to the upper half of the group; "Honors" to the lower half. To be eligible for this recognition, a total of at least two years of residence (60 semester hours) is required. No student with an average less than B (3.0) will be considered.

DEFICIENCY REPORTS

1. Reports of unsatisfactory work (less than C) will be made only for freshmen in the basic freshman courses. It will be the obligation of all students to assume full responsibility for their academic progress without depending upon receiving official warning of unsatisfactory work.

2. Reports of unsatisfactory work for freshmen in the basic freshman courses will be submitted to the student's dean at the end of the seventh week of the semester.

DISMISSAL OF DELINQUENT STUDENTS

The University reserves the right to request at any time the withdrawal of a student who cannot or does not maintain the required standard of scholarship, or whose continuance in the University would be detrimental to his or her health, or to the health of others, or whose conduct is not satisfactory to the authorities of the University. Specific scholastic requirements are set forth in the Minimum Requirements for Retention and Graduation.

WITHDRAWALS FROM THE UNIVERSITY

1. Should a student desire or be compelled to withdraw from the University at any time, he must secure a notice of withdrawal from his divisional officer, obtain the proper signatures, and submit the notice along with his University identification cards to the Office of the Vice Chancellor for Student Affairs. This office will file the withdrawal with the Office of Registrations which will record a mark of W for all courses and notify the instructors of the withdrawal.

2. The effective date of withdrawal as far as refunds are concerned is the date that the notice is received by the Office of the Vice Chancellor for Student Affairs. The Office of Registrations will record the effective date of withdrawal on the student's permanent record.

READMISSION AND REINSTATEMENT

READMISSION

1. A student whose continuous attendance at the University has been interrupted, but who was in good academic standing, or on academic probation, at the end of the last regular semester for which he was registered, must apply to the Office of Admissions for readmission. He will be readmitted to the program in which he was last registered.

REINSTATEMENT

1. A student who withdraws from the University must apply for reinstatment to the Secretary of the Petition Board, Office of Admissions.

2. A student who has been dropped for scholastic reasons may appeal in writing to the Secretary of the Admissions Petition Board, Office of Admissions, for reinstatement. The committee is empowered to grant relief in unusual cases, if the circumstances warrant such action.

3. A student who has been dropped from the University for scholastic reasons, and whose petition for reinstatement is denied, may again petition after a lapse of at least one semester.

MINIMUM REQUIREMENTS FOR RETENTION AND GRADUATION

1. A minimum of 120 credits of successfully completed (not I, F, or W) course credits are required for graduation in any degree curriculum. (See DEGREE REQUIREMENTS AND CREDIT BY EXAMINATION above.) Credits transferred, or earned during prior admissions terminating in academic dismissal or withdrawal and followed by readmission, will be applicable toward meeting credit requirements for a degree. (See RE-ADMISSION AND REINSTATEMENT above.)

2. A full-time student will be placed on academic probation at the end of any semester in which he does not achieve a total of 24 quality points for that semester, except that he will *not* be placed on academic probation for this reason if he earns at least a 2.0 average on a registration (at the end of the schedule adjustment period) of 9-11 credits. Exceptions are also allowed for all full-time students in their first semester of registration on the College Park Campus, who must earn at least 18 quality points for that semester. This exception does not apply to students who have earned more than 8 credits through previous registration in the University.

3. Any student, full- or part-time, who fails to maintain a minimum *cumulative* average of 1.95 at the end of any semester following that in which the total of credits completed at the College Park Campus (with grades of A, B, C, D, P, S, or F), plus any credits transferred, is 45 credits, will be placed on academic probation. Credits completed with grades of A, B, C, D, and F, but not S, P, or I will be used in the computation of the cumulative average.

4. A student who does not meet the academic standards for any given semester will be placed on probation and must display acceptable performance in quality points and cumulative average (if applicable) during the next semester in order to regain good academic standing. A student will be dismissed at the end of the second consecutive, or fourth total, semester of unacceptable performance. Courses for which the mark W is recorded are excluded from all such computations or credit requirements.

5. A student who has been academically dismissed and who is reinstated, will be academically dismissed again if he does not meet the academic standards for any two additional semesters after his return. In the computation of his cumulative average after return, all credits earned at the University of Maryland will be used.

6. When a student is placed on academic probation or is academically dismissed, the action shall be entered on the student's official and permanent record.

7. Any course may be repeated, but if a student repeats a course in which he has already earned a mark of A, B, C, D, P or S, the subsequent attempt shall not increase the total hours earned toward the degree. Only the higher mark will be used in computation of the student's cumulative average. However, the student's quality points in a given semester shall be determined by that semester's grades.

8. Any appeal from the regulations governing academic probation or academic dismissal shall be directed to the Petition Board, which shall be empowered to grant relief in unusual cases, if the circumstances warrant such action.

STUDENT AFFAIRS

VICE CHANCELLOR FOR STUDENT AFFAIRS

The Division of Student Affairs is responsible for the various services and operations pertaining to the life and welfare of students outside of their formal instructional experience. Be it an office administratively serving the students, a counseling oriented function or an experience in educational programming, the offices within Student Affairs are concerned with alleviating those problems and issues which could interfere with a full and positive learning experience and with developing experiences which relate to but are not usually contained in the classroom experience. At a large University like Maryland, where one could easily become lost in his quest for learning these goals become all the more paramount.

The Vice Chancellor for Student Affairs and his staff administer this Division. Following are the offices which compose it, along with a brief description of their function.

DEPARTMENT OF RESIDENT LIFE

This office administers, supervises, and coordinates all aspects of the University residence facilities, including both management operation and educational-social-recreational programming. The residence accommodations are divided into semi-autonomous residential communities, each headed by a full-time professional Director with a staff of full and part-time professional and para-professional personnel.

Each community enjoys considerable freedom to develop in a way which reflects the personalities, interests and needs of the residents.

Office location: 3rd floor, North Administration Building. Telephone: 454-2711.

FOOD SERVICE

The purpose of the University Food Service is to provide nutritionally balanced and tastefully prepared meals, served in an atmosphere that is esthetically pleasant and relaxing.

Office location: Hill Area Dining Hall. Telephone: 454-2901.

GREEK AFFAIRS OFFICE

This office is in close contact with the 45 sororities and fraternities on this campus. The Advisor for Greek Affairs advises the Interfraternity and Panhellenic Councils and the Greek honoraries. This office coordinates all Greek programs and activities including rush, pledge training, judicial matters, alumni relations and other related areas.

Office location: 2nd floor, North Administration Building. Telephone: 454-2936.

THE OFFICE OF COMMUTER STUDENT AFFAIRS

The Commuter Affairs Office has been established to assistant commuter students at the University of Maryland. This office sponsors the development of programs that increase the interaction and identification among the commuters and the University as a whole. In addition, it endeavors to solve difficulties more characteristic of commuters than residents.

Office location: 1211-G Student Union Building. Telephone: 454-5275.

STUDENT DEVELOPMENT

The Office of Student Development provides a wide variety of educational experiences of interest to students. These include: student community projects through PACE (People Active in Community Efforts), new student and parent orientation programs, small group seminars on topics such as sex, drugs, racism, women's roles in society and human relations, principles and techniques of organizational leadership, consulting help to student organizations including the Commuter Association, Student Government Association, Black Student Union, Greeks, Free University and a broad range of political, social, academic and religious associations.

Office location: Student Union, Room 1211. Telephone: 454-2827.

HEALTH CENTER

The Health Center provides immediate outpatient and short-term inpatient medical care for illnesses and injuries not requiring hospitalization but preventng students from attending classes. In addition to general medical aad psychiatric services, other services include allergy treatment, physical therapy and rehabilitation, environmental health and safety, and preventive medicine. Emergency services are available to part-time students and all services are available to full-time students.

Office location: Health Center (across from Student Union). Telephone: 454-3444.

COUNSELING CENTER

Psychologists provide professional counseling services for students with educational-vocational and emotional-social adjustment problems. Educational specialists provide individual and group work for improving reading and study skills. No appointment is needed for initial conferences.

Available in the reception lobby are occupational and educational information, plus tape recorded conversations with academic department chairmen about their disciplines.

National testing programs (CLEP, GRE, Miller Analogies, etc.) are administered by the Counseling Center as well as testing for counseling purposes.

Office location: Shoemaker Building. Telephone: 454-2931.

CAREER DEVELOPMENT CENTER

The Career Development Center encourages and assists all students in contacting prospective employers and in determining economic and occupational trends for career determination.

Career advisors, programs, services and facilities are geared toward broadening students' knowledge of graduate school, government, education, business, and industrial opportunities. An excellent resource is the Career Library (Room 26 of the Career Development Center).

Seniors within two semesters of graduation are encouraged to participate in the on-campus interview program with employers from late October to early April. Further details on this program are available in the Career Development Center.

All seniors graduating in the College of Education (except Education for Industry majors) are required to file credentials with the Career Development Center.

Office location: Cumberland Hall basement. Telephone: 454-2813.

MINORITY STUDENT AFFAIRS

The Office of Minority Student Affairs was offically created on July 1, 1972 as a result of proposals and recommendations submitted to the Chancellor from the Campus Black Community and the Study Commission on Student Life. It is responsible for addressing the needs of minority students during their experience at the University of Maryland. This responsibility takes the Office of Minority Student Affairs through a broad range of concerns, from the introduction of minority stu-

dents to the University, to special supportive programs.

The Office is directly responsible for the administration of the Intensive Educational Development Program and Upward Bound, the Cultural Study Center, and Nyumburu Community Cultural Center.

The following is a brief description of the programs administered by the Office of Minority Student Affairs.

INTENSIVE EDUCATIONAL DEVELOPMENT AND UPWARD BOUND

The IED Program is funded jointly by the Federal Government and the University to provide services for students admitted with identified educational needs. The goal of the IED Program is to provide the academic support necessary for student participants to become successful degree candidates. The Offices of the IED program may be found on the second floor of the North Administration Building and at the Nyumburu Community Cultural Center.

The Upward Bound Program at College Park is part of a nation-wide program to bring high school students to college campuses with the aim of preparing them to meet the academic rigors of the college experience.

The similarity of the IED and Upward Bound Programs has made it an administrative practicality to combine the two to form a comprehensive academic support program, inclusive of both the Upward Bound high school student and the IED program university student.

THE CULTURAL STUDY CENTER

The Cultural Study Center was established for the purpose of studying minority and other student cultural sub-groups at the University of Maryland. Research covers the socio-economic background and psychological development of the students as well as their experiences on campus, including admissions, attrition, academics, adjustments, and problems of student life.

NYUMBURU CULTURAL COMMUNITY CENTER

Nyumburu Cultural Community Center functions to bring the attention of the University Community to the cultural panorama of black America. The Center utilizes the varied capabilities and experiences of members of the campus as well as individuals in surrounding areas in efforts to present a balanced view of cultural endeavors in the black community.

Nyumburu has successfully supported literary workshops and publications, dramatic presentations, series of visiting artists, and a wide variety of programs reflecting the modern black experience.

Nyumburu Cultural Center is housed in Temporary Building CC.

STUDENT AID

The Office of Student Aid administers a variety of financial assistance and student employment opportunities, primarily based on the need of the applicant. The staff of the office is available for individual counseling on matters pertinent to the financial planning of the student body. Details on available aid and application procedures are described in this Catalog.

ENTERTAINMENT AND CULTURAL ACTIVITIES

An extensive schedule of entertainment is available throughout the year on campus. Concerts, dances, drama, and speakers representing all tastes and points of view are arranged for the enjoyment of the Campus community. Many of these are funded by the Student Government Association and are free to University students. For some there is a minimal charge. The Office of Entertainment and Cultural Activities is the coordinating office for these occasions.

INTERNATIONAL EDUCATION SERVICES AND FOREIGN STUDENT AFFAIRS

The Office of International Education Services provides a wide variety of services designed to assist foreign students to make the necessary adjustment to American university and community life and to help them derive the maximum benefit from their experience in the United States. Services include advising on admission to the University, issuance of immigration documents, special orientation programs, emergency loans, assistance with securing housing, information about educational, cultural, and social opportunities, and personal advising. Some of these services are available also for visiting foreign faculty. For American students, the Office provides information about opportunities for travel and study abroad.

Information, forms and assistance in making necessary arrangements for complying with immigration regulations are available at the Office of International Education Services and Foreign Student Affairs. Information regarding the filing of income tax returns may also be secured from the same office.

Foreign students are subject to the same regulations that govern the academic life and personal conduct of American students enrolled in the University.

Office location: 2nd floor, North Administration Building. Telephone: 454-2936.

RELIGIOUS PROGRAMS

A broad range of religious traditions is represented by the several chaplains and religious advisors at the University. Individually and cooperatively, they offer many services including counseling, worship, study opportunities here and

abroad, personal growth groups, and opportunities for service and involvement.

Office location: University Memorial Chapel. Telephone: 454-2925.

STUDENT UNION SERVICES AND FACILITIES

The Union provides a variety of programs, services and facilities for the diverse needs and aspirations of the Campus Community.

The Union is open daily:
- Monday-Saturday—7a.m.-Midnight
- Sunday—12 noon-Midnight

Services include:
- Bulletin Boards
- Check Cashing
- Display Showcases
- Food Service
  - Snack Bars
  - Cafeteria
  - Dining Room
  - Vending Room
  - Pizza Shop
  - Coffee House Lounge
  - Banquets and Catering
- Lounges
- Meeting Rooms
  - Size from 8-1500 people
- Movies (Movie Theater)
- Notary Public(s)
- Piano Practice Rooms
- Recreation Center
  - Bowling Lanes
  - Billiard Room
  - Table Games Room
  - Pin Ball Machines
- Sign Shop
  - Signs—plastic, letterpress, embosograf
  - Duplicating—ditto, mimeograph, offset
- TV Room
- Ticket Office
  - Campus Concerts
  - Selected off-campus events
  - Travel Information
  - American Airlines Youth Fare Cards
- Tobacco Shop
- U.S. Postal Service Automated Facility

Directory

UMporium (bookstore)	454-3222
Information and Reservations	454-2801
Administrative Offices	454-2807
Food Service	454-2805
Ticket Office	454-2803
Bowling and Billiards	454-2804

ATHLETICS

The University of Maryland Athletic Department fields varsity teams in football, soccer, and cross country in the fall; basketball, fencing, swimming, wrestling, and indoor track during the winter; and baseball, golf, tennis, lacrosse, and outdoor track in the spring. Freshman schedules also prevail in football and basketball. Maryland is a member of the Atlantic Coast Conference, which also includes Clemson, Duke, North Carolina, North Carolina State, Virginia, and Wake Forest. The University has won the Carmichael Cup, symbolic of top overall athletic performance in the ACC, in all except three of the first ten years the trophy has been in existence.

Women's teams in the following six sports represent the University of Maryland in intercollegiate competition: field hockey, volleyball, swimming, basketball, tennis, and lacrosse. The schedules include teams from Washington, D.C., Maryland, Virginia, and Pennsylvania; the teams also compete in appropriate local, state and regional tournaments.

JUDICIARY OFFICE

The Campus Judiciary Office effects discipline of the undergraduate students. Under the framework of a judiciary program which emphasizes personal growth and development, the aims of judicial actions are largely educative and preventive. Judiciary Office staff members review all reports of alleged misconduct, contact those individuals involved and in most instances schedule the case for hearing.

Office location: 2nd floor, North Administration Building. Telephone: 454-2927.

GENERAL REGULATIONS

PART I—

(The following regulations and procedures are subject to change. For the most current revision see *Student Handbook,* or consult the Judiciary Office staff.)

A. GENERAL POLICY

The University's approach to student discipline is primarily an educative and preventive one. It assumes that discipline is properly the concern of the entire University community—the student body, the faculty and the administration.

In order that uniform standards may be maintained, all disciplinary action concerning students or student organizations is subject to review by the Adjunct Committee on Student Conduct of the College Park Campus Senate. The rules and regulations of any organization or department that wishes to establish a disciplinary unit must be submitted to the Adjunct Committee on Student Conduct and the Vice Chancellor for Student Affairs for approval or modification.

Cases involving infractions of University rules, other than academic, which apply to all students

are referred immediately to the Judiciary Office on the College Park campus. (Graduate students are referred to the Dean of the Graduate School.) The Judiciary Office or the Dean will investigate the case and take appropriate action.

In situations involving undergraduates, the Judiciary Office will refer the case to one of the judicial boards for appropriate action, according to the jurisdictional area of the various student boards and the seriousness and nature of the offense. The Judiciary Office may handle administratively those students in need of special remedial attention and those cases where an administrative hearing is requested by the student.

Students charged with violating University regulations are guaranteed administrative due process in the handling of the charges, the conduct of the hearings, the imposition of sanctions, and the right of appeal.

B. SUSPENSION OF A STUDENT FROM CLASS

Discipline in the classroom is the responsibility of the faculty member in charge of the class. Misbehavior of a type that interferes with the educational efficiency of a class will be considered sufficient cause for suspending a student from the class. If a student is suspended from class for disciplinary reasons, he should report immediately to the department chairman. The department chairman will investigate the incident and will report it to the academic dean and to the Judiciary Office, in order to determine whether or not past disciplinary action has been taken against the student. The department head will then write a letter to the student indicating the disposition of the case. The student will be required to present this letter to his instructor before he can be readmitted to class. A copy of this letter will be sent to the Judiciary Office.

Disruption of a class by a student not enrolled in that class can be referred to the Judiciary Office. Disruption by a non-student can be referred to the campus police.

C. SUSPENSION OF A STUDENT FROM ACTIVITIES OR UNIVERSITY FACILITIES

The individual or group of individuals in charge of any department, division, organization, building, facility or any other unit of the University (e.g., Dining Hall, Student Union, etc.) shall be responsible for student discipline within such units. The person responsible for each unit may suspend the student or student organization from the unit. The suspended student or representative of the student organization will be referred immediately to the Student Affairs Judiciary Office. The Judiciary Office will investigate the incident and notify the student of the disposition of the case. The individual responsible for the suspension will be notified before the student or his organization can be readmitted. A file of such actions shall be kept in the Judiciary Office.

D. IDENTIFICATION CARDS

Official University of Maryland student identification cards and transaction plates are issued to all registered undergraduate and graduate students. The identification card and the transaction plate are for use only by the student to whom issued and may not be transferred or loaned to another individual for any reason. Loss of either the I.D. card or the transaction plate, or both, should be reported at once to the Office of the Vice Chancellor for Student Affairs. A replacement fee of $3.00 for each item is required prior to the creation of authorized duplicates.

E. IMPORTANT UNIVERSITY REGULATIONS WHICH APPLY TO ALL STUDENTS

The following behavior may result in referral to the Judiciary Office for appropriate action. Typically, disciplinary sanctions will be imposed not only for individual misconduct which demonstrates a disregard for institutional behavioral standards, but also for conduct which indicates disregard for the rights and welfare of others as members of an academic community. Such conduct may ultimately call into question the student's membership in the University community, either because he has violated elementary standards of behavior necessary for the maintenance of an educational milieu or because his continued presence at the University adversely affects the ability of others to pursue their educational goals.

1. VIOLATION OF FIRE REGULATIONS—This includes failure to comply with evacuation procedures, tampering with fire-protection apparatus, use or possesion of fireworks or firearms, or use of open-flame devices or combustible materials which endangers the safety or well-being of the University community; or unauthorized use of electrical equipment.
2. BEHAVIOR WHICH JEOPARDIZES THE SAFETY OR WELL-BEING OF OTHER MEMBERS OF THE UNIVERSITY COMMUNITY OR PERSONS COMING ONTO UNIVERSITY PROPERTY—This includes physical harrassment of, or interference with firemen, policemen or other persons engaged in the performance of their official duties; physical abuse or threatening physical abuse of any person on University property; forcible detention of any person on University property.
3. UNAUTHORIZED POSSESSION, USE, OR DISTRIBUTION OF ALCOHOLIC BEVERAGES ON OR IN UNIVERSITY PROPERTY—University policy, consistent with State and County laws, restricts on-campus use of alcoholic beverages in specified areas.
4. POSSESSION, USE, SALE OR DISTRIBUTION ON OR IN UNIVERSITY PROPERTY OF ILLEGAL DRUGS OR OF DRUGS FOR WHICH

THE REQUIRED PRESCRIPTION HAS NOT BEEN OBTAINED—This includes possession, use, distribution, sale, manufacture or processing of illegal or unprescribed narcotics, drugs, and/or hallucinogenic substances.

5. DESTRUCTION, THEFT, ATTEMPTED THEFT, OR IMPAIRMENT OF PERSONAL OR UNIVERSITY PROPERTY—Disciplinary action may include a requirement of restitution.

6. UNAUTHORIZED POSSESSION OR USE OF UNIVERSITY KEYS—Keys to rooms or buildings on the University campus may be obtained only through official channels.

7. UNAUTHORIZED ENTRY INTO OR PRESENCE IN A UNIVERSITY BUILDING OR FACILITY—Except for properly scheduled use, classroom, administration and recreation buildings are closed to general student use on holidays, Saturday afternoon, Sundays and after 12 midnight during the week. Students may use a building or facility for a specified purpose upon written permission from a member of the faculty with approval of the academic or administrative officer normally having control over such building or facility, which permission may be revoked or withdrawn.

8. FALSIFICATION, FORGERY, OR MODIFICATION OF ANY OFFICIAL UNIVERSITY RECORD—Identification card, absence excuses, parking stickers, transcripts, examinations, grade cards, admission applications, etc.

9. PLAGIARISM, CHEATING AND OTHER ACADEMIC IRREGULARITIES—A student who violates accepted academic procedure may be referred to the Dean of his College or to an *Ad Hoc* Commitee on Academic Dishonesty. (See Irregularities in Examinations for specifics)

10. FAILURE TO MEET FINANCIAL OBLIGATIONS TO THE UNIVERSITY—This includes refusal to pay delinquent accounts and use of worthless checks or money orders in payment to the University for tuition, board, fees, library fines, traffic penalties, etc.

11. OBSTRUCTION OF, DISRUPTION OF, OR INTERFERENCE WITH ANY UNIVERSITY ACTIVITY OF AN ACADEMIC NATURE; ACTIONS ON THE PART OF STUDENTS WHICH SUBSTANTIALLY OBSTRUCT, DISRUPT, OR INTERFERE WITH NON-ACADEMIC ACTIVITIES ON UNIVERSITY PREMISES BY MEMBERS OR AUTHORIZED NON-MEMBERS OF THE UNIVERSITY COMMUNITY.

12. VIOLATION OF UNIVERSITY HOUSING REGULATIONS—

13. VIOLATION OF UNIVERSITY CAMPUS TRAFFIC RULES AND REGULATIONS—

PART II—

ENFORCEMENT PROCEDURES

It is a general expectation that individuals and groups will abide by the behavioral guidelines established by this policy statement. Compliance with these minimal standards for responsible conduct is a necessary condition for maintaining a campus atmosphere in which dissent and demonstrations are viewed as important aspects of the University's educational program.

Reports of violations by undergraduate students will be referred to the Judiciary Office of the Vice Chancellor for Student Affairs and reports of violations by graduate students will be referred to the Dean for Graduate Studies and Research. Actions taken by these offices will follow procedures set forth in this chapter.

When violations continue beyond the enforcement capabilities of the University staff, such outside assistance as is necessary may be requested. These requests will be made in accordance with policy and procedures established by the University.

Disciplinary Actions

1. DISCIPLINARY REPRIMAND

A disciplinary reprimand is written notification from a University official to a student containing a warning that repeated infractions of regulations may result in more severe disciplinary action. A record of the letter will be filed in the Student Affairs Judiciary Office. The student's parents may be notified.

2. CONDUCT PROBATION

This action involves a period of time, not to exceed one year, in which a student is expected to show a positive change in behavior. In addition, conditions and restrictions may be imposed, including revocation of specific privileges and recommendations for counseling interviews with the Judiciary Office. The student's parents may be notified. A violation of conduct probation may be the basis for severe disciplinary action.

3. DISMISSAL FROM UNIVERSITY HOUSING

In the case of a serious violation of house rules, residence hall probation, or housing regulations, a student may be dismissed from University housing for a specified period of time. Such dismissal results in a percentage room and board refund, according to the regular University refund policy.

4. DISCIPLINARY PROBATION

This action involves a period of time, not to exceed one year, during which a student who has been involved in a disciplinary situation (or repeated violations) is given an opportunity to prove that he can become a responsible and effective member of the University community.

In deciding upon the action of disciplinary probation, a judicial board may subject the activities of the student to any one, or more, of the following conditions:

1. A student on disciplinary probation may not represent the University in any extracurricular activities such as intercollegiate athletics, debate teams, University Theatre, or band; however, he may participate in informal activities of a recreational nature sponsored by the University.

2. A student on disciplinary probation may not run for or hold office in any organization that is recognized by the Adjunct Committee on Student Activities.

3. The student's activities may be restricted in other ways which pertain to the type of offense.

4. The student may be required to make restitution or repairs.

When a student has been placed on disciplinary probation, the Judiciary Office will officially notify the student of the decision and will indicate that any violation of his probationary status may result in suspension or expulsion. The Judiciary Office will inform appropriate University authorities of the disciplinary action and may notify the student's parents.

If a student is found guilty by a judicial board of any infraction of University regulations during his probationary period, the board may recommend that he be suspended or expelled from the University.

At the end of the probation period, the student's case will be reviewed by the Judiciary Office. If all conditions of the disciplinary action have been met satisfactorily, the student will be considered in good standing, behaviorally.

5. SUSPENSION FROM THE UNIVERSITY

A student's suspension from the University shall be for an indefinite period of time. However, the Judicial Board recommending this action must specify the date at which he subsequently may apply to the Judiciary Office for readmission, and in no case will this date be later than one year after the effective date of the suspension. The academic record of the student will not in any case affect this application for readmission after suspension for disciplinary reasons. All recommendations for suspension must be approved by the Vice Chancellor for Student Affairs. Parents are notified in all cases.

During the period of suspension, the student may not participate in any University-sponsored activity or in the activities of any recognized University organization. In addition, he will be denied all other rights and privileges which are accorded to students in good standing.

a. Suspended Suspension by Vice Chancellor for Student Affairs.

Suspension is withheld pending careful evaluation of a student's behavior during a probationary period not to exceed one year. If the student is involved in any further offense, this suspension of disciplinary action may be summarily revoked by the Vice Chancellor and the original decision of suspension from the University enforced.

b. Deferred Suspension by Vice Chancellor for Student Affairs.

This is a suspension which becomes effective after a specific future date. It is normally used near the end of a semester to avoid financial penalty that would be entailed by an immediate suspension. Probationary status will exist during this period identical to *suspended* suspension.

6. EXPULSION FROM THE UNIVERSITY

This is the most serious penalty and results in a complete separation of the relations between the University and the student. Parents are informed and permanent notification appears on the student's official transcript. Expulsion must be approved by the Chancellor.

APPEALS

Any disciplinary decision may be appealed to the next higher disciplinary unit. The highest board of appeal is the Adjunct Committee on Student Conduct of the College Park Campus Senate. An appeal must be made through the Judiciary Office or through the Dean who is responsible for the administration of the decision being appealed. It will be forwarded to the appropriate judicial board for review. The appeal must be in writing, must indicate the basis for the appeal, and must be made within ten days of the date the student was notified of the decision which he is appealing. In hearing an appeal, the next higher disciplinary unit may affirm or reduce the original decision or may return the decision to the lower board for reconsideration.

STUDENT DISCIPLINARY RECORDS

All disciplinary actions by the judicial boards are reported to the Judiciary Office of the Vice Chancellor for Student Affairs where they will be recorded. All records of disciplinary action, except those resulting from expulsion, will remain confidential, will be segregated from the student's academic record, and will not be available to unauthorized persons on campus, or to any person off campus, without the express consent of the student involved, except under legal compulsion or in cases where the safety of persons or property is involved.

Except in cases where the student has demanded a public hearing, disciplinary action is confidential; and no member of a judicial board may disclose any information concerning the hearing, the student's prior disciplinary record, the current disciplinary action taken, or any information as to the voting. Any public release of information concerning disciplinary action will be issued only by the Judiciary Office. According to a policy established by the Adjunct Committee on Student

Conduct, names of students involved in disciplinary action may not be printed in campus publications and may not be made public. Any judicial board may recommend that no publicity of any nature be released by the Judiciary Office on a case if circumstances so warrant.

PART III— DISCIPLINARY RULES AND PROCEDURES

(Adopted by the Board of Regents March 19, 1971)

A. GENERAL

1. The following rules and procedures are hereby declared to be in addition to and supplementary of any and all rules and regulations which are not or hereafter may be applicable to any campus under the jurisdiction of the Board of Regents of the University (the Regents). The jurisdiction conferred in the plans for the Undergraduate Judicial System and the Graduate Judicial System adopted in 1969, as from time to time amended, is hereby preserved, provided, however, that when the procedures specified in this Part III shall have been initiated, in accordance with the terms hereof, this Part III shall control, and all such jurisdiction shall be transferred to and shall be governed by the procedural and substantive context of this Part III. Any prior action of the Board which might be construed to be inconsistent with the delegation of power hereby made is rescinded to the extent of such inconsistency.

B. PROCEDURE

1. This Part III shall apply to all cases where, in the judgment of the president or his delegate, the chancellor, a student has violated any one or more of the rules established by Section C hereof, and where the president or his delegate, the chancellor, has followed the requirements of this Section B. If a determination has been made as provided in this Paragraph 1, and notice has been served in accordance with Paragraph 3 hereof, then, and in such event, the provisions of this Part III shall control the case to the exclusion of any other general and academic regulations applicable to any campus of the University.

2. If the president, or the chancellor, has concluded, upon *prima facie* evidence, that a student has violated one or more of the rules established by Section C hereof, then the president or the chancellor may serve such student with notice that he may be subject to disciplinary action including suspension or expulsion and that a hearing will be held to determine the matter, such notice to be in the form and containing the information required by Paragraph 3 hereof. The chancellor, or, in his absence, his designee, may temporarily suspend a student for an interim period pending a disciplinary hearing, such temporary suspension to become immediately effective without prior notice, whenever in his judgment there is evidence of severe misconduct indicating that the continued presence of the student on the University campus poses a threat to University property, to members of the University community, to himself, or to the stability and continuance of normal University functions. A student suspended on an interim basis shall be given the opportunity to promptly appear personally before the chancellor or in his absence his designee and to have a hearing on the following issues only:

(a) the reliability of the information on the student's misconduct, including the matter of his identity;

(b) whether the misconduct and surrounding circumstances reasonably indicate that the removal of the student from the University campus is required to safeguard himself, members of the University community, University property, or the continuance of normal University functions.

This Part III shall become applicable only upon the condition that the president, or his delegate, the chancellor, has invoked the procedures contained in this Part III within ten (10) days after the receipt by the president, or his delegate, the chancellor, of the prima facie evidence required by this paragraph. Unless or until the student has been served with notice in accordance with this Part III, the discipline of any student shall be controlled by the plans for the Undergraduate Judicial System and Graduate Judicial System adopted in 1969, as from time to time amended, or by any other system which has been established in accordance with legally approved standards that may have been or may be adopted for any campus of the University.

3. The procedures and substance of this Part III shall be initiated only upon written notice being served on the student personally or sent to the student involved at his address appearing on the records of the University, by certified mail, advising him of the following (personal service or the receipt by the University of a return receipt of mailing being hereby defined as "service with notice."):

(a) a specific description of the misconduct with which he is charged and a list of those rules in Section C hereof which he has allegedly violated by such misconduct, together with a copy of any written complaint relating to the case;

(b) that he shall be provided a hearing as provided in this Part III not less than four (4) nor more than fourteen (14) calendar days after the effective date of service of notice, such hearing to be held even if he chooses not to appear, and such notice shall specify a date, time and place for the hearing;

(c) that the hearing will be open to the public and press unless he requests that it be closed

and its proceedings and decisions considered confidential;

(d) that he shall be permitted to inspect at the office of the chancellor or in some other designated office on campus in advance of the hearing any affidavits, exhibits, or written evidence which the University intends to submit at the hearing;

(e) that he may be accompanied and represented at the hearing by an advisor of his choice, who may be an attorney;

(f) that he shall be permitted to hear the evidence presented against him and that he shall be permitted to question at the hearing any witness who gives evidence against him;

(g) that he shall have the opportunity to present his version at the hearing by way of affidavits, exhibits, and witnesses;

(h) that he has been temporarily suspended from the University, if that be the case; and

(i) if relevant, notice of the possible denial of financial aid pursuant to Section 497 of the Education Amendments of 1972 (P.L. 90-575).

4. A. All Part III cases shall be heard, in the first instance, by a University Judicial Board (the Board).

B. An accused student or the person presenting the case for the University may request of the chancellor the disqualification of any member of the Board selected to serve thereon for the hearing by submitting a letter to the chancellor showing that such member is related or has had a business or close personal association with the accused student, with the complainant, or with any person who has been substantially and adversely affected by the student's alleged conduct. The chancellor may conduct such investigation of the ground for disqualification as he sees fit. The previous participation as a Board member in a hearing involving the accused student shall not be grounds for disqualification. The decision of the chancellor as to whether or not there are sufficient grounds for disqualification is final. If an accused student chooses to invoke the rights conferred by this subparagraph, his hearing before the Board shall be postponed for such period of time (not to exceed seven [7] calendar days) which will enable the chancellor to determine whether the disqualification of any member of the Board is warranted.

C. The Board shall be appointed for each of the campuses of the University by the president or by his delegate, the chancellor. The Board shall be composed of either five (5) or seven (7) members, at the discretion of the appointing authority. One of the members of the Board shall be a member of the administration of the University. The remaining members of the Board shall be equally divided between students and members of the University faculty. Both undergraduates and graduate students shall be represented on the Board at all times. The student members of the Board shall be chosen (if undergraduates) by lot from the members of all existing judicial boards and (if graduate students) by lot from a panel to be maintained by the student members of the Graduate Student Association. The faculty members of the Board shall be chosen by lot from a panel of not less than thirty (30) to be maintained by the senate of the appropriate campus, and in the absence of such list, by the chancellor. The members of the Board shall select the chairman. More than one Board may be established from time to time at the discretion of the appointing authority. A majority vote of the Board shall be sufficient to decide any case that may come before it.

5. The following rules shall apply to any hearing conducted by the Board:

(a) A student shall file with the Board his address to which notice of its decision may be mailed, and the mailing of such decision to such address shall be conclusively presumed to comply with the notification required by the first sentence of Paragraph 10 hereof. All hearings shall be open to the public, but the Board may restrict the number of observers to that which the hearing room may comfortably accommodate. A student appearing before the Board may request that the hearing shall be closed to the public, and this request shall be honored by the Board. Sequestration of witnesses may be ordered. The Board may exclude from the hearing any person, other than the student charged, whose conduct disrupts, disturbs or delays the proceedings. Should the student charged engage in conduct that impedes the progress of the hearing, or makes a fair hearing impossible, the Board may pass an order suspending such student from the University, and such suspension shall thereafter continue until after the hearing, or any adjournment thereof, shall have been concluded and the appeal therefrom, if any, shall have been heard and decided. In addition, the Board may adjourn the proceeding, and in such a case the suspension of such student (whether made by the chancellor in accordance with Paragraph 2 hereof or by the Board in accordance with this subparagraph 5(a)) shall continue until after the conclusion of the adjourned hearing and the time for appeal therefrom has expired.

(b) a pending criminal or civil trial involving the accused student will *not* be considered grounds for postponement of the disciplinary hearing, unless the date of the judicial trial conflicts with the date of the University hearing.

(c) A student may be represented at a hearing before the Board by an advisor, who may be an attorney. The Board may be assisted in the conduct of the hearing by a legal advisor (either the director of the Judiciary Office or some other qualified individual).

(d) The student or his advisor shall have the opportunity to question all witnesses, to present witnesses in his own behalf, to present any other evi-

dence, and to make an opening and closing statement.

(e) The person who shall bring the charges under these rules shall be the chancellor or the acting chancellor. Evidence against a student shall be presented by a person designated by the chancellor. The person presenting the case for the University, the University's attorney, and the Board shall have the opportunity to question all witnesses and to present witnesses and evidence relating to the charge specified in the notice.

(f) Formal rules of evidence shall not be applicable to disciplinary hearings, and any evidence or testimony which the Board believes to be relevant to a fair determination of the charges specified in the notice may be admitted. Hearsay evidence or documents not verified may be admitted for the purpose of explaining or corroborating other evidence but shall not be sufficient to support a determination of the truth of the charges unless such hearsay or documentary evidence would be admissible in judicial proceedings.

(g) A student charged under this Part III shall be presumed innocent, and the burden of proof shall be the responsibility of the University. A student charged under this Part III shall not be required to testify before the Board, and his failure or refusal to so testify shall not be construed as an admission against interest.

(h) A full and complete record shall be made of the proceedings before the Board. A recording or other suitable device shall be used. A copy of this record shall be supplied to the student. A student may arrange to have a court stenographer present at his own expense.

(i) Rulings on evidence and all other matters relating to the hearing shall be made by the Board, and such ruling shall be binding upon all parties.

(j) If a student fails to appear for a hearing after having been duly served with notice thereof as required by Paragraph 3 hereof, the hearing shall be adjourned, and in such case the suspension of such student (if the student has been suspended) shall continue until after the conclusion of the adjourned hearing and the appeal therefrom, if any, shall have been heard and decided. If the Board determines, upon clear and convincing evidence, that the accused student has willfully failed to appear for the hearing, the Board may order the immediate suspension of such student from the University.

(k) If a student leaves the hearing before its conclusion without the permission of the Board, the hearing shall be adjourned, and in such case the suspension of such student (if the student has been suspended) shall continue until after the conclusion of the adjourned hearing and the appeal therefrom, if any, shall have been heard and decided. Withdrawal by a student from the hearing shall be grounds for his temporary suspension from the University by the Board.

(l) Students charged with misconduct arising from a single incident or occurrence may have their hearings joined either at the request of the students involved or at the request of the chancellor. Requests for joint hearings shall be decided by the Board. The Board may sever a student's case from others involved in a joint hearing at any stage in the proceedings, and without affecting the progress of other cases involved, where it appears necessary to insure a fair hearing for all.

6. If a hearing has been adjourned for cause, it shall be rescheduled within ten (10) calendar days from its originally scheduled date. No notice of such adjourned hearing must be given to the student involved, but a reasonable effort to so notify him shall be made. At any adjourned hearing, the rules established in paragraph 4 hereof shall control.

7. The Board shall make its findings based upon substantial evidence produced before it. Such findings shall be contained in a written report which shall be submitted to the chancellor of the campus, within five (5) days of the close of the hearing. The report shall contain:

(a) A finding that the student did or did not commit the acts charged;

(b) If the finding is that the student did commit the acts charged, a further finding that the acts committed did or did not constitute a violation of the rules established in Section C of this Part III;

(c) If the finding is that the student did commit the act charged, and if the student is the recipient of funds under a program enumerated in Section 497 of the Education Amendments of 1972 (Public Law 90-575), a further finding as to whether the act was of a serious nature and contributed to a substantial disruption of the administration of the University so as to warrant discontinuance for a period of two years, any further payment to, or for the direct benefit of the student under any of the programs specified in the aforesaid Section 497 of the Education Amendments of 1972; and

(d) A penalty, if any, to be imposed.

8. If the Board finds that a penalty should be imposed as provided by paragraph 7(d) hereof, it may invoke the following sanctions:

(a) disciplinary reprimand, or
(b) conduction probation, or
(c) dismissal from University housing, or
(d) disciplinary probation, or
(e) suspension from the University, or
(f) expulsion from the University.

If the Board imposes the sanctions provided by sub-paragraphs (a) to (d) of this paragraph, then the prior suspension of the accused student, if any, shall be lifted, and the continued discipline of the student shall be as provided in the order of the Board. If the Board finds the accused student innocent of the offense with which he was charged, his temporary suspension, if any, shall be lifted. In all cases where a temporary suspension has been

lifted, the student shall be given an opportunity to complete interrupted academic work. In invoking the power to sanction a student as provided hereby, the Board may consider any prior disciplinary action taken against the student involved.

9. In the event that the Board shall fail to submit a report to the chancellor of its findings and recommendations within seven (7) calendar days after the close of the hearing, then the chancellor shall promptly give notice to the accused student and appoint another University Judicial Board as required by these rules, and thereafter a new hearing shall be held by such successor Board, all in accordance with the rules contained in this Part III.

10. Within ten (10) calendar days after notice of the Board's decision the student may appeal that decision. If no such appeal is taken, the order of the Board shall be final and conclusive. Such appeal shall be noted by filing a written request therefor with the chancellor which shall state the grounds upon which the appeal is taken and shall also state the address of the appellant, which address shall be used by the appellate agency for the service of notice as required by Paragraph 11 hereof. If the student shall have been suspended, any such appeal shall continue that suspension, notwithstanding the sanctions, if any, imposed by the Board as provided by Paragraph 8 hereof. The student charged shall have the option to appeal either to:

(a) the chancellor of the campus, or
(b) the president of the University, or
(c) an arbitrator as provided for by Paragraph 12 hereof.

11. All appeals, as provided by Paragraph 10 hereof, shall be taken upon the record made before the Board. No testimony or other evidence shall be introduced before the appellate officer. However, the parties may submit written briefs stating their contentions concerning the case and may be represented before the appellate officer by a representative or legal counsel who may present oral arguments on their behalf. The appeal shall be heard within fourteen (14) days after it has been noted in accordance with Paragraph 10 hereof. The student-appellant shall be sent a notice of the time and place for the hearing of the appeal; the requirement of notification contained in this paragraph shall be satisfied by the mailing thereof to the student-appellant at his address shown on his notice of appeal as required by Paragraph 10 hereof. The appellate officer may affirm, modify, revise or reverse the decision of the Board, or he may remand the case to the Board for further proceedings not inconsistent with its findings, but it may not increase the sanctions imposed by the Board. The decision of the appellate officer shall be made in writing; it shall be made within ten (10) days after he has heard the case; his decision shall be final and binding upon the parties; the decision shall be communicated in writing to the accused student by the appellate officer and to the parents or legal guardians of the student if he is under the age of twenty-one (21) years.

12. The accused student may appeal the decision of the Board to an impartial arbitrator appointed directly by the National Center for Dispute Settlement of the American Arbitration Association (NCDS). Such appointment may be challenged by either party for good cause. The NCDS shall decide the question of good cause. In addition to the requirements of Paragraph 10 hereof, the student shall initiate the arbitration by mailing or delivering in person two copies of a notice of a desire to arbitrate to the National Center for Dispute Settlement, 1815 H Street, NW, Washington, D.C. 20006, which notice shall constitute a contract on behalf of the student that he shall be bound thereafter by the decision of the National Center for Dispute Settlement. The arbitration shall be conducted in accordance with the Community Dispute Settlement Rules of the National Center for Dispute Settlement to the extent such rules are not inconsistent with the provisions of these rules. Where any such inconsistency may exist, these rules shall be controlling. Questions of such inconsistency shall be decided by the arbitrator. The costs of the arbitration proceeding shall be borne equally by the student and the University. A student who is unable to pay his share of these costs may petition the University to bear the whole cost of the arbitration, provided that the petition plus supporting documents is submitted to the chancellor for his decision prior to the filing of a notice of a desire to arbitrate.

C. DISCIPLINARY RULES

1. The disciplinary rules contained in this section C are the rules which may invoke the procedures stated in section B hereof.

(a) Violation of fire regulations, failure to comply with evacuation procedures, tampering with fire-protection apparatus, use of fireworks, or use of open-flame devices or combustible materials which endanger the safety or well-being of the University community; or unauthorized use of electrical equipment.

(b) Unauthorized entry into or presence in a University building or facility. Except for properly scheduled use, classroom, administration and recreation buildings are closed to general student use on holidays, Saturday afternoon, Sundays and after 12 midnight during the week. Students may use a building or facility for a specified purpose upon written permission from a member of the faculty with approval of the academic or administrative officer normally having control over such building or facility, which permission may be revoked or withdrawn.

(c) Obstruction of, disruption of, or interference with any University activity of an academic nature; actions on the part of students which substantially

obstruct, disrupt or interfere with non-academic activities on University premises by members or authorized non-members of the University community.

(d) Destruction, theft, attempted theft, or impairment of University property.

(e) Behavior which jeopardizes the safety or well-being of other members of the University community, or persons coming onto University property; physical harrassment of, or interference with firemen, policemen or other persons engaged in the performance of their official duties; physical abuse or threatening physical abuse of any person on University property; forcible detention of any person on University property.

(f) Possession, use, sale or distribution on or in University property of illegal drugs or of drugs for which the required prescription has not been obtained.

(g) The possession or use of bombs or explosive devices of any character; the threat, either made orally or in writing, that any bomb or explosive device has been or may be implanted in or upon any property or building of the University.

PART IV—
SELECTED POLICY STATEMENTS

POLICY ON AMPLIFYING EQUIPMENT

(As adopted by University Senate, June 2, 1970)

1. Public address systems, loudspeakers and other forms of sound amplifying equipment may be used in any of the following outdoor areas of the campus:
   a. Physical education and intramural field between University Boulevard and parking area 1.
   b. North Mall between Campus Drive and Washington-Baltimore Boulevard.
   c. South Mall between Regents Drive and Washington-Baltimore Boulevard.
   d. Athletic practice fields east of Byrd Stadium.
2. The use of public address systems, loudspeakers and other forms of sound amplifying equipment must be restricted in the Central Mall area between 8 a.m. and 6 p.m. on class days in order to minimize the likelihood of disturbing classes and other academic activities. However, such equipment may be used in the Central Mall during these hours if the procedures outlined below are followed. All equipment used in Central Mall must be secured through the Office of the Director of the Physical Plant or through the S.G.A. office.
   a. Public address systems, loudspeakers and other forms of sound amplifying equipment (except in "b" below), must be secured from the Office of the Director of Physical Plant, South Administration Building, by requesting such equipment in writing at least twelve (12) hours in advance. Any University student or organization which fulfills the following requirements will be permitted to use the amplifying equipment.
      (1) An individual must be currently enrolled as a student, part-time or full-time, at the University or currently employed by the University.
      (2) Any organization or activity must have been recognized by the SGA Legislature and must at the time of the request have official recognition as a University organization or activity.
   b. Bullhorns will be available upon surrender of the I.D. card in the SGA office and in the Office of the Director of the Physical Plant. Bullhorns secured in this manner may be used on the Central Mall without prior permission. Any individual may use only one bullhorn at a time.
3. Public address systems, loudspeakers and other forms of sound amplifying equipment may be used in outdoor areas of the campus other than those listed above (sections 1 and 2) by securing approval in writing at least 5 days in advance from the Facilities Use Committee by application to the Office of the Director of the Physical Plant. Approval will be granted for use of amplifying equipment in these areas only if there is a high probability that the planned activity will not disrupt or disturb other University activities or if the area has not been previously reserved. Permission will be granted to use amplifying equipment in the vicinity of residence halls only upon specific written request of the student government of the residence halls affected.
4. Individual students or organizational representatives using amplifying equipment must accept responsibility for any complaints of disturbances or disruption received from persons in University academic and/or residence buildings.

POLICY ON DEMONSTRATIONS

(As adopted by University Senate, June 2, 1970)

I. GENERAL STATEMENT

a. The University of Maryland cherishes the right of individual students or student groups to dissent and to demonstrate, provided such demonstrations do not disrupt normal campus activities, or infringe upon the rights of others.

b. On the other hand, the University will not condone behavior which violates the freedom of speech, choice, assembly, or movement of other individuals or groups. In

short, responsible dissent carries with it a sensitivity for the civil rights of others.

c. Accordingly, the University will take whatever steps it deems necessary to (1) protect the right of any individual or group to demonstrate and publicly proclaim any view, however unpopular; (2) protect the freedom of speech, assembly and movement of any individual or group which is the object of demonstrations.

To achieve the foregoing objectives the following guidelines have been developed for operation at College Park:

II. GUIDELINES FOR GENERAL DEMONSTRATIONS

a. Unscheduled demonstrations, "teach-ins," rallies, or equivalent activities may be held by recognized university organizations and activities, full or part-time students, and current employees of the University in the areas defined below provided that the activity does not interfere with any function for which that space has been reserved in advance.

1. The Central Mall
2. Physical education and intramural field between University Boulevard and parking area 1.
3. Athletic practice fields east of Byrd Stadium
4. North Mall between Campus Drive and Washington-Baltimore Boulevard.
5. South Mall between Regents Drive and Washington-Baltimore Boulevard.

All activities in these areas must be conducted so as to avoid interference with the regularly scheduled functions of the library and/or classrooms adjacent to the area and in compliance with the provisions contained in IIg, 1-8.

Failure to reserve space will not invalidate the privilege of conducting the appropriate activity. However, in the event of two or more groups desiring to use a given space, an approved space reservation will take precedence over an unscheduled activity. If two or more groups desire a space when no reservation has been made, the first come, first served principle will apply.

b. Recognized University organizations and activities, full or part-time students, and current employees of the University who wish to schedule a demonstration, "teach-in," rally, or equivalent activity, may request the space through the facilities reservation procedure up to 24 hours in advance. Demonstrations will be permitted in the locations outlined in IIa. above unless the space has previously been reserved or is in use for academic activities or intercollegiate athletic team practices. Demonstrations may be held at other locations on the campus subject to approval by the Vice Chancellor for Student Affairs in consultation with the Student Life Committee. Students who participate in demonstrations which have not been approved may be considered in violation of University policy. (Except as provided in IIa. above.)

c. Demonstrations, rallies or "teach-ins" may be conducted in or adjacent to any residential building with the specific written concurrence of the student government of the unit or area concerned. Any such rallies, demonstrations or "teach-ins" which may be authorized by the appropriate student government must conform to the general procedures contained in IIg. 1-8.

d. Demonstrations in the form of parades on streets may be conducted with the specific approval of route and time secured 48 hours in advance from the University Public Safety and Security Office.

e. Although groups may sponsor or organize demonstrations, rallies, "teach-ins," or picketing activities, the fact of group sponsorship or organization in no way relieves individuals of the responsibility for their own conduct, and each individual participating in such activities is accountable for compliance with the provisions of this policy.

f. Persons not members of the University student body, faculty or staff may participate in demonstrations, rallies, picketing, teach-ins or equivalent activities only upon invitation by a bonafide student, faculty or staff member. All non-students are obligated to the terms of this policy during participation in such activities. Since persons not students, faculty or staff members are not subject to University discipline procedures, failure to comply with terms of this policy may result in action under terms of appropriate Maryland law.

g. In addition to the above provisions, the following guidelines will apply to all demonstrations.

1. Reasonable access to and exit from any office or building must be maintained. The right of way on public streets and sidewalks will be maintained.
2. Demonstrators will not attempt to force the cancellation or interruption of any event sponsored by a University office or by a faculty or student group or by any group authorized to use University facilities.
3. Classes or other educational activities in classroom buildings and the library will not be disrupted.

4. The use of public address systems, loudspeakers, etc., in the vicinity of academic and residence buildings will follow procedures set forth above.
5. Demonstrations may be carried on inside of University buildings only as provided in Sections IIc and 4 or with approval of the Facilities Use Committee as outlined in the University General and Academic Regulations.
6. Where an invited speaker is the object of protest, students and faculty may demonstrate OUTSIDE the building where the lecture will take place. Demonstrators who wish to enter the building must do so as members of the audience and must give the speaker a respectful hearing. Signs, placards or other paraphernalia associated with a demonstration will not be carried into the building.
7. University property must be protected at all times.
8. The safety and well being of members of the University community collectively and individually must be protected at all times.

h. Complaints received from users of the Library or classrooms adjacent to the defined areas (IIa.) will be grounds for disciplinary action against individuals and/or groups sponsoring or participating in rallies, "teach-ins" or demonstrations in these areas.

III. GUIDELINES FOR DEMONSTRATIONS IN CONNECTION WITH PLACEMENT PROGRAMS

a. Anyone wishing to question or protest the on-Campus presence of any recruiting organization should contact the Director of the Career Development Center or his representative in advance.

b. Should any member of the University Community wish to discuss or protest the *internal policies* of any recruiting organization, the Director of the Career Development Center must be contacted for assistance in communicating directly with the appropriate representatives of said organization.

c. Demonstration guidelines outlined in Section IIg. 1-8 are applicable.

d. Demonstrations in conjunction with placement programs conducted in the Career Development Center's Cumberland Hall facility or other facility shall be considered not to infringe upon the rights of others and the normal functioning of placement programs provided that demonstrations are conducted outside of the facility and do not interfere with free and open access to the Career Development Center facilities by those students, faculty, staff, and visitors who wish to conduct business within the framework of established placement programs.

IV. SPECIAL GUIDELINE PERTAINING TO THE STUDENT UNION

a. No demonstrations, rallies, "teach-ins" or equivalent activities may be held in the lobbies or corridors of the Student Union.

b. Demonstrations may be held in assigned rooms of the Student Union by recognized student organizations following procedures for reserving space which have been outlined by the Student Union Board.

V. GUIDELINES FOR PICKETING

a. Legal Rights and Limitations.
Orderly picketing is a legally established form of expression which recognizes the individual's right of free expression subject only to such reasonable limitations as are imposed by State legislation and University regulations. These limitations are intended to protect the rights of the picketer, the student body and the public with particular concern for safety, preservation of normal academic life and order, and the protection of persons and property.

b. Conduct of Picketers.
1. Picketers are subject to those regulations listed above in Section II, g, 1-8.
2. Picketers will not disrupt any University activity by making excessive noise in the vicinity of any University building.
3. The University Health Service is off-limits to picketers because special silence and other welfare and safety factors are involved.

ALCOHOLIC BEVERAGE POLICY AND PROCEDURES

POLICY

Regulations forbid unauthorized possession, use or distribution of alcoholic beverages on or in University property. University policy is consistent with State and County laws and restricts ON-CAMPUS use of alcoholic beverages in specified areas.

Interpretation

1. *AGE*—Students under 21 years of age may not possess, consume or distribute alcoholic beverages.
2. *LICENSING*—Temporary licenses are available through the Board of License Commissioners for Prince George's County, Maryland, consistent with existing County and State law.
3. *RESTRICTED AREAS*—Alcoholic beverages may not be possessed, consumed or distrib-

uted in any academic facility, except where specific, written approval has been obtained for the event from the individual or department responsible for the operation of that facility. This restriction applies to all dining halls, cafeterias, classroom and office buildings, libraries, laboratories, administrative buildings, and athletic facilities.

When planning an event where alcoholic beverages will be brought in by the individual consumers, or will be given away, or where donations will be invited, the following procedures should be followed:

1. Receive written approval for the use of your facility—in the residence areas check for any local restrictions established by unit governments.
2. Secure and complete the *Registration Of A Student Social Event* form in the Office of Student Development. (Suite 1211, Student Union.)
3. Secure and complete the *Alcoholic Beverage Registration* form which names the person responsible for the event.

PART V—MOTOR VEHICLES

Parking facilities at the University are extremely limited and are primarily intended for use by commuting students. Most parking areas are located on the periphery of the campus and are usually five or six blocks away from residence halls and classroom buildings.

Freshman and sophomore resident students are not permitted to register motor vehicles on campus; however, they may obtain on-campus weekend parking privileges. Any freshman or sophomore (i.e., a student who has earned fewer than 56 academic credits) who needs a motor vehicle for work, or for any other purpose, should consider making off-campus living arrangements.

Motor scooters, motorcycles, motor-bikes, or bicycles are not permitted inside any residence hall. They must be parked in those outside areas specifically marked for them.

CAMPUS TRAFFIC RULES AND REGULATIONS

(Academic Year 1973-74)

These regulations apply to all who drive motor vehicles on any part of the campus at College Park.

1. PURPOSE OF TRAFFIC REGULATIONS

a. To facilitate the work of the University by providing parking space for those who need it most.

b. To provide parking space for University visitors and guests.

c. To protect pedestrian traffic.

d. To assure access at all times for ambulance and fire-fighting apparatus.

e. To control vehicular traffic on the Campus.

2. REGISTRATION OF VEHICLES:

a. All motor vehicles, including motorcycles and scooters, operated on campus by a person associated with the University, must be registered with the Vehicle Registration Office regardless of ownership, except as noted in Regulation 2c. All student vehicles must be registered in the name of the student who is the legal operator of the vehicle.

b. Student vehicles must be registered for the current academic year during the applicable registration period. A registration charge will be made for each vehicle. *This Fee Cannot Be Refunded.*

1. Fall Semester beginning in August—for first vehicle $10.00
   Each additional vehicle 2.00
2. Spring Semester beginning in January—for first vehicle 5.00
   Each additional vehicle 1.00
3. Summer Semester 2.00
   Each additional vehicle 1.00

All Registrations will expire on the next following August 15. Proof of ownership or legal control will be required for multiple registrations. *Students applying for registration of additional vehicles must present the State vehicle license number and the University of Maryland registration number of their initially registered vehicle for the current academic year.* No charge will be made for replacement of registration sticker required due to damaged bumper of a registered vehicle or because of a replacement for a registered vehicle. Remnants of stickers to be replaced MUST be turned in at the Motor Vehicle Registration Desk.

c. Resident students who have earned less than 56 semester credits shall be prohibited from operating a motor vehicle on the College Park campus, and from registering a vehicle under provisions of these regulations, except for special weekend privileges as provided in regulation 2d. This prohibition applies to any freshman or sophomore student residing within one (1) mile radius of the Library, providing said residence is other than that shown as student's legal residence at time of registration.

d. Resident students who have earned less than 56 semester credits are permitted to operate a motor vehicle on the College Park campus during the hours from 5:00 P.M. Friday to 12 midnight Sunday only. Vehicles operated on the campus under provisions of this regulation must be registered

in accordance with regulations 2a and 2b. Special "weekend" registration stickers will be issued. Vehicles displaying weekend stickers will be considered not registered if observed on the campus at any time other than the specified weekend period.

e. Parking permits for faculty and staff are issued initially at the time of employment. Subsequent renewals will be scheduled at times designated.

f. Only one set of parking permits for each vehicle is authorized.

g. Vehicles are not considered officially registered until permits are affixed on front and rear bumpers or on metal plates affixed to license plates.

h. Temporary parking permits for visiting groups and for special reasons and conditions are available. Requests should be made to the Motor Vehicle Administration Section—Telephone Ext. 4242.

i. Parking permits must not be transferred to any vehicle other than the one for which they were originally issued.

j. Parking permits must not be defaced or altered in any manner.

3. TRAFFIC REGULATIONS:

a. All motor vehicles are subject to University traffic regulations while on the University campus. The University assumes no responsibility for loss or damage to private property.

b. All traffic and parking signs must be obeyed.

c. It is impossible to mark with signs all areas of University property where parking is prohibited. Parking or driving is definitely prohibited on grass plots, tree plots, construction areas, or any place which will mar the landscaping of the campus, create a safety hazard or interfere with the use of University facilities.

d. All regulations must be observed during registration and examination periods, except as may be otherwise indicated by official signs. During final examination periods and the Summer School session, registered vehicles may park in any numbered parking area except Areas 5, 6, and 9.

e. Operation of any motor vehicle in such a manner as to create excessive noise or smoke, or operation of any vehicle which is in an unsafe condition, will result in revocation of parking permit and issuance of a Maryland State Summons for violation of Article 66½ Annotated Code of Maryland.

f. Pedestrians shall have the right-of-way at all times.

g. The maximum speed on campus roads is 20 miles per hour. During changes of classes and in areas of pedestrian traffic cars must be driven more slowly.

h. Vehicles, including motorcycles and motor scooters, must be parked in assigned areas only. Certain parking areas are restricted to faculty and academic staff at all times. This restriction is indicated on the official sign at the entrance to the area. In all other parking areas. unrestricted parking for any vehicle registered on the campus is permitted from 5:00 p.m. to 12:00 midnight, Monday thru Thursday; and from 5:00 p.m. Friday to 12:00 midnight Sunday.

i. Any motor vehicle parked in violation of University traffic regulations or abandoned on campus is subject to removal and impounding at the expense of the owner or operator. (See Regulation 4c.)

j. Specific spaces in parking areas shall not be reserved or marked for any department or individual.

k. If an unregistered vehicle is used as an emergency substitute for a registered vehicle, it must be parked in the regularly assigned area and an immediate report made to the Motor Vehicle Administration Section—Ext. 4242.

l. In parking areas which have marked spaces and lanes, a vehicle must be parked in one space only, leaving clear access to adjacent spaces, and without blocking driving lanes or creating a hazard for other drivers.

m. Parking is not permitted at crosswalks.

n. Parking or standing is prohibited on all campus roads at all times.

o. In cases where individuals are permitted to register more than one vehicle for parking on the campus, only one of these vehicles may be parked in the assigned area at any time.

p. Metered parking spaces must be used in accordance with requirements as stated on official signs. Non-registered student vehicles parked in metered spaces will be in violation of Section 2A.

q. Curbed recesses are reserved for VISITORS and GUESTS between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday.

r. The fact that a vehicle is parked in violation of any regulation and does not receive a violation notice does not mean that the regulation is no longer in effect.

4. TRAFFIC INFORMATION:

a. The Office of the Campus Police is located in the Service Building and may be reached on University campus telephone Ext. 3555.

b. The Cashier's Office and the Motor Vehicle Administration Section are in the Service Building, Campus telephone Ext. 4242.

c. The term abandonment, as it relates to automobiles parked on property owned or leased by the University of Maryland, shall mean any one or more of the following conditions:

(1) Any vehicle which has not been moved for thirty (30) days and whose owner or other claimant the University is unable to locate.

(2) Any vehicle which has not been moved for thirty (30) days and whose identified owner or other claimant refuses to move it.

(3) Any vehicle on which current license plates are not displayed and which has not been moved for ten (10) days.

(4) Any vehicle which has not been moved in seven (7) days due to an inoperative condition caused by the removal of necessary parts or a wrecked condition.

5. PENALTIES

a. Any person connected with the University who operates an unregistered vehicle on the campus, or who registers such a vehicle in any way contrary to the provisions of these regulations, will be subject to payment of a fifteen ($15.00) dollar penalty in addition to the penalty for any other regulation violation connected therewith.

b. Violations of any campus traffic regulation other than improper registration or overtime meter parking, will result in penalty as listed below:

(a) Penalty for parking a registered vehicle in a parking area other than properly assigned area. . . . $5.00

(b) Parking a registered vehicle on a roadway, in a posted fire lane or posted no parking area. $5.00

(c) Parking any vehicle, including cycles, on walks, grass area, plazas, and any other places not designated as areas for parking or driving without special permit signed by head of Grounds Division $5.00

Violator will be additionally liable for amount of any specific damage caused by such action.

c. Overtime parking in any metered space will result in penalty of one ($1.00) dollar for each maximum time period on meter.

d. Violations are payable within ten (10) calendar days from date of issue at the office of the Cashier in the General Services Building and an additional penalty of $2.00 will be imposed for failure to settle violations on time.

e. Visitors and guests notices issued to University visitors must be signed and returned either in person or by mail to the Vehicle Registration Cashier, University of Maryland, College Park, Md. 20742, or to the University Official visited. *Violation notices must be returned 10 days after date of issue.* The violation may be voided at the discretion of the Vehicle Registration Office, and if not voidable will be returned for payment.

f. Violations involving an unregistered vehicle owned by a member of the immediate family of a student may be charged to the student's account unless settled by the individual receiving the ticket, in accordance with stated privileges granted to visitors and guests.

g. Motor Vehicle privileges will be revoked by action of the Vehicle Registration Office in accordance with the following conditions:

(1) When a student has accumulated at least three (3) violations on the record, he (she) will lose motor vehicle privileges for a period of four (4) weeks.

(2) When a student has accumulated an additional two (2) violations on the record for a total of five (5), he (she) will lose motor vehicle privileges for a period of sixteen (16) weeks.

(3) In each case the student will be required to remove the registration stickers and turn in remnants of the stickers to the Motor Vehicle Registration Section.

(4) When the prescribed period of time for loss of motor vehicle privileges has passed, the student will be required to pay the regular fee for re-registration.

(5) All conditions described in Items 1, 2, 3, and 4 apply to all vehicles registered by any student.

h. Persistent violators of traffic regulations will be referred to the Judiciary Office for appropriate action.

6. APPEALS:

a. An Appeals Board composed of a minimum of three students who are members of the Student Traffic Board meets regularly to consider appeals from students charged with violations. Students wishing to appeal a violation will first register intent to appeal in the Service Building, thence to the Judiciary Office, Room 218, North Administration Building where the date and time for the appeal will be furnished the appellate. Traffic tickets must be appealed

within (10) calendar days from the date of issuance. Overtime parking meter violations are not subject to appeal.

b. A special Board composed of designated members of the traffic committee will consider and act upon requests for exceptions to any traffic regulation. All actions of this Board will be final.

7. PARKING AREAS FOR STUDENTS:

Area 1—West of Cole Activities Building, between Stadium Drive and Campus Drive

Area 2—North of Denton Hall Dorm Complex

Area 3—Southwest Corner of Campus

Area 4—North of Heavy Research Laboratory

Area 7—East of U.S. No. 1, at North Gate

Area 10—East of U.S. No. 1, North of Fraternity Row

Area 11—Northeast of Asphalt Institute Building

8. PARKING AREAS FOR FACULTY, STAFF AND ASSIGNED RESIDENT STUDENTS ONLY:

Area *5—Student Housing Area East Side Campus, Leonardtown Modular Units

Area *6—North of Dining Hall No. 5 and East of Elkton Dorm

Area *9—Vicinity of Cambridge Hall Dorm Complex

Area 12—South of Allegany Hall

Area 14—Loop Roads Front and Rear of Houses on Fraternity Row

Area 15—Rear 7402 Princeton Avenue

Area 17—Special Parking for use of Center for Adult Education

Area *A—West End of BPA Building

Area AA—North of Fine Arts and west of the Education Classroom Building

Area *B—Adjacent to Computer Science Center

Area BB—East end of practice field

Area C—Adjacent to Turner Laboratory (Dairy)

Area CC—Barn area

Area *D—Rear of Journalism Building

Area DD—East of Space Sciences Building

Area *E—Adjacent to Engineering Buildings

Area EE—North of Engineering Laboratory Building

Area *F—Adjacent to Fire Service Extension Building

Area FF—East of Animal Science Building

Area *G—Between Silvester Hall and Skinner Building

Area GG—North of Adult Education Center Building

Area *H—Adjacent to Symons Hall and Holzapfel Hall

Area HH—Adjacent to H. J. Patterson Hall—Botany

Area I—Rear of Molecular Physics Building

Area J—West of Annapolis Hall

Area K—Adjacent to General Service Building

Area KK—West of New Physical Education Building

Area L—Administration-Armory Loop

Area *M—Adjacent to Infirmary

Area N—Rear of J. M. Patterson Hall—Industrial Education

Area O—East and West of School of Architecture

Area OO—Adjacent to Zoology-Psychology Building and Undergraduate Library

Area P—East of Wind Tunnel

Area *PP—Between Math Building and Cyclotron

Area Q—Rear of Jull Hall

Area *R—Circle in front of Byrd Stadium Field House, Stadium Garage and adjacent to Preinkert Field House

Area RR—East of Asphalt Institute

Area *S—Special Food Service

Area T—North of Engineering Laboratory Building

Area TT—Service Area West of Physics Building

Area U—Rear of McKeldin Library

Area UU—North end 3 Lot

Area V—Open area between Building DD and Building EE

Area *W—Between Skinner Building and Taliaferro Hall

Area *XX—West—New Chemistry Wing

Area Y—West of Chapel

Area YY—West of Cumberland Hall

Area Z—Adjacent to Cole Field House, West Side

Area *Z—Rear Cole Field House

*Restricted at all times

Coke

GO TERPS

II
DIVISIONS, COLLEGES AND SCHOOLS

Prior to development of the academic reorganization, the departments, programs, institutes and the like were grouped within colleges and schools which, traditionally, were the largest academic units. In the new structure, colleges and schools are grouped within larger Divisions as may be seen by referring to the chart at the front of the Catalog. In addition, some academic departments and programs exist within the Divisions independently of colleges and schools. This section describes the new organization, its purposes and functions in detail. A knowledge of Divisions and their interrelationships will help you in planning your education.

DIVISION OF LIFE SCIENCES AND AGRICULTURE

The Division of Life Sciences and Agriculture offers educational opportunities for students in subject matter relating to living organisms and their interaction with one another and with the environment. Education in all aspects of agriculture is included. In addition to pursuing the Baccalaureate degree, a number of students in this Division engage in pre-professional education in such fields as pre-Medicine, pre-Dentistry, and pre-Veterinary Medicine.

The Division was established in connection with the academic reorganization on the College Park campus and is expected to be fully implemented July 1, 1973. Because the Division is establishing specific details of its organization and program, many facts regarding admission to Division degrees, requirements for these degrees and other items of interest to the student cannot be stated at this time. As details concerning these items reach final form, they will be made available to students through the office of the Chairman of the Division. Requirements established by Departments in the College of Agriculture will be found in the material which follows.

ADMISSION

The requirements for admission to the Division are, in general, the same as those for admission to the other units of the University. Application must be made to the Director of Admissions, University of Maryland, College Park, Maryland.

The student who intends to pursue a program of study in the Division of Life Sciences and Agriculture should include the following subjects in his high school program: English, four units; college preparatory mathematics (algebra, plane geometry), three or four units; biology, chemistry, or physics, two units; history and social sciences, one or more units.

The student who wishes to major in chemistry, botany, microbiology, zoology, or who wishes to follow a pre-medical or pre-dental program, should include four units of college preparatory mathematics (algebra, plane geometry, trigonometry, and more advanced mathematics, if available). He should also include chemistry and physics.

ADVISORS

Each freshman in this college will be assigned to a faculty advisor who will help the student, during his first year, to select his courses and to determine what his field of major concentration should be.

The student at the sophomore level and above will be advised by a faculty member in his major department. Students following the three-year programs in dentistry, law, and medicine will be advised by special advisors for these programs.

The Division includes the Departments of Botany, Chemistry, Entomology, Geology, Microbiology and Zoology. The College of Agriculture in the Division includes the Departments of Agricultural and Extension Education, Agricultural Engineering, Agricultural and Resources Economics, Agronomy, Animal Science, Dairy Science, Horticulture, Poultry Science and Veterinary Science. It also includes the Institute of Applied Agriculture, a two year program of vocational education administered through the Department of Agricultural and Extension Education.

Within the College of Agriculture, there are educational opportunities in curricula which span several departments. These include a curriculum in Conservation and a curriculum in Food Science.

In addition to the educational resources on the campus, students with specific interests have an opportunity to utilize libraries and other resources of several of the government agencies located close to the campus. The Laboratories of the Natural Resources Institute and those conducting agricultural research throughout the state are also available to the student.

AGRICULTURE

THE COLLEGE OF AGRICULTURE offers educational programs with a broad cultural and scientific base. Students are prepared for careers in agricultural related sciences, technology and business.

The application of advanced knowledge to the solution of some of man's most critical problems concerning adequate amounts and quality of food, and the quality of the environment in which he lives, are important missions of the College.

This original College of the University of Maryland at College Park was chartered in 1856. The College of Agriculture has a continuous record of leadership in education since that date. It became the beneficiary of the Land-Grant Act of 1862. Since that time, there has been a merger with the University of Maryland in Baltimore and continuous growth with additions of other colleges and departments at College Park.

The College of Agriculture continues to grow and develop as part of the greater University, providing education and research activities enabling man to use his environment and natural resources to best advantage while conserving basic resources for future generations.

ADVANTAGES OF LOCATION AND FACILITIES

Educational opportunities in the College of Agriculture are enhanced by the nearby location of several research units of the federal government. Of particular interest is the Agricultural Research Center at Beltsville and the U. S. Department of Agriculture Headquarters in Washington, D. C. The National Agricultural Library is an important resource for information at the Beltsville location.

Related research laboratories of the National Institutes of Health, military hospitals, NASA, and the National Bureau of Standards are in the vicinity. Interaction of our faculty and students with personnel from these agencies is encouraged. Teaching and research activities are conducted with the cooperation of scientists and professional people in government positions.

Instruction in the basic sciences, and in social, economic and engineering principles is carried out in well-designed classrooms and laboratories on the campus. The application of basic principles to practical situations is demonstrated for the student in numerous ways. New buildings have been provided for both the plant and animal sciences in recent years.

Modern greenhouses are available for breeding and propagation of a wide variety of plant work on the control of weeds and improved cultural practices.

Herds of dairy and beef cattle, swine and flocks of poultry and sheep are kept on the campus for teaching and research purposes.

Several operating farms, located in central Maryland, Southern Maryland and on the Eastern Shore, support the educational programs in Agriculture by providing locations where important crops, animals and poultry can be grown and maintained under practical and research conditions. These farms add an important dimension to the courses offered in Agriculture. Data from these operations and from cooperating producers and processors of agricultural products are utilized by students interested in economics, teaching, engineering, and conservation, as they relate to Agriculture, as well as by those concerned with biology or managment of agricultural crops and animals.

GENERAL INFORMATION

The College of Agriculture offers programs leading to a wide variety of rewarding careers. These curricula prepare the student for useful, informed citizenship, with a basic understanding of science in general, and with a concentration on the science and business of agriculture in particular. All four-year programs lead to the Bachelor of Science degree.

Today's agriculture is a highly complex and extremely efficient industry which includes supplies and services used in agricultural production, the

production process itself, and the marketing, processing and distribution of products to meet the consumers' needs and wants.

Instruction in the College of Agriculture includes the fundamental sciences and emphasizes the precise course information that its graduates must employ in the industrialized agriculture of today, and helps develop the foundation for their role in the future. Course programs in specialized areas may be tailored to fit the particular needs of the individual student.

Previous training in agriculture is not a prerequisite for matriculation. Careers for men and women with rural, suburban or urban backgrounds are available in agriculture and its allied industries.

Graduates of the College of Agriculture have a broad base for careers and continued learning after college in business, production, teaching, research, extension, and many other professional fields.

REQUIREMENTS FOR ADMISSION

The requirements for admission to the College of Agriculture are the same as those of the University.

For students entering the College of Agriculture it is recommended that their high school preparatory courses should include English, 4 units; mathematics, 3 units; biological and physical sciences, 3 units; and history or social sciences, 2 units. Four units of mathematics should be elected for students entering agricultural engineering or agricultural chemistry.

JUNIOR STANDING

To earn Junior standing a student must complete 56 credit hours of academic work and attain the required grade point average.

REQUIREMENTS FOR GRADUATION

Each student must complete at least 120 credit hours in academic subjects with a minimum grade point average of 2.0 (C). University requirements in health and physical education must be satisfied, in addition.

HONORS PROGRAM

The Honors Program is approved for majors in Agricultural and Resource Economics. The objective of the Honors Program is to recognize superior scholarship and to provide opportunity for the excellent student to broaden his perspective and to increase the depth of his studies.

The programs in Honors are administered by Departmental Honors Committees and supervised by the College Committee on Honors. Students in the College of Agriculture, who are in the top 20 percent of their class at the end of their first year may be considered for admission into the Honors Program. Of this group up to 50 percent may be admitted.

Sophomores or first semester Juniors will be considered upon application from those students in the upper 20 percent of their class. While application may be made until the student enters his sixth semester, early entrance into the program is recommended. Students admitted to the program enjoy certain academic privileges.

On the basis of the student's performance during his participation in the Honors Program, the department may recommend the candidate for the appropriate degree with (departmental) honors, or for the appropriate degree with (departmental) high honors. Successful completion of the honors program will be recognized by a citation in the Commencement Program and by an appropriate entry on the student's record and diploma.

FACULTY ADVISEMENT

Each student in the College of Agriculture is assigned to a faculty advisor. Advisors normally work with a limited number of students and are able to give individual guidance. The faculty will assist students in obtaining employment providing practical or technical experience for those in need of such experience.

FRESHMAN YEAR

The program of the freshman year is similar for all curricula of the College of Agriculture. During the first year the student obtains a broad foundation in subjects basic to agriculture and the related sciences. Transfer from one curriculum to another, or from the College of Agriculture to another college of the University may be made by the end of the freshman year usually with little or no loss of credit.

Students entering the freshman year with a definite choice of curriculum are assigned to departmental advisors for counsel and planning of all academic programs. Students entering the freshman year, who have not selected a definite curriculum, are assigned to a general advisor who assists with the choice of freshman electives and, during the course of the year, acquaints students with opportunities in the curricula in the College of Agriculture and in other divisions of the University. If by the close of the freshman year a student makes no definite choice of a specialized curriculum, he continues under the guidance of his advisor in the General Agriculture curriculum.

SCHOLARSHIPS

A number of scholarships are available for agricultural students. These include awards granted by the Agricultural Development Fund, Bayshore Foods, Inc., Capitol Milk Producers Cooperative,

Inc., Dairy Technology Society of Maryland and the District of Columbia, Delaware-Maryland Plant Food Association, Inc., Dr. Ernest N. Cory Trust Fund, Danforth Foundation, Frederick County Holstein Association, General Foods Fund, The Staley and Eugene Hahn Memorial Scholarship Fund, Hyattsville Horticultural Society, Inter-State Milk Producers, The Kinghorne Fund Scholarship, Lindback Foundation, Maryland Cooperative Milk Producers, Inc., Maryland Turfgrass Association, Maryland State Golf Association, Maryland and Virginia Milk Producers, Inc., Maryland Veterinarians, Dr. Ray A. Murray Scholarship Fund, NOPCO, Ralston Purina Company, The Schluderberg Foundation, Southern States Cooperative, Inc., The Leander F. Stuart Memorial Fund, the Joseph M. Vial Memorial Scholarship Program in Agriculture and the Nicholas Brice Worthington Scholarship.

STUDENT ORGANIZATIONS

Students find opportunity for varied expression and growth in the several voluntary organizations sponsored by the College of Agriculture. These organizations are: Agricultural Economics Club, Block and Bridle, Dairy Science Club, Collegiate 4-H Club, Future Farmers of America, Agronomy Club, and the Veterinary Science Club.

Alpha Zeta is a national agricultural honor fraternity. Members are chosen from students in the College of Agriculture who have attained the scholastic requirements and displayed leadership in agriculture.

The Agricultural Student Council is made up of representatives from the various student organizations in the College of Agriculture. Its purpose is to coordinate activities of these organizations and to promote work which is beneficial to the College.

REQUIRED COURSES

All students in the College of Agriculture are required to complete a series of courses to satisfy the University General Education requirements, college requirements and departmental requirements. The courses needed to complete a program of study are selected by the student with the approval of his advisor.

University Requirements	Semester Credit Hours
ENGL 101 or 171—Composition or Honors Composition	3
Literature	6
Social Science	6
History	6
Mathematics	3
Fine Arts or Philosophy	3
HLTH 105—Science and Theory of Health	(2)
Physicial Education	(2)
COLLEGE OF AGRICULTURE REQUIREMENTS	
Courses selected from the basic life sciences, physical sciences and mathematics	16
SPCH 107—Public Speaking	2
AGRI 101—Introduction to Agriculture	1
Department Requirements	74

TYPICAL FRESHMAN YEAR IN AGRICULTURE

	Semester I	Semester II
ENGL 101 or 171—Composition or Honors Composition	3	.
Social Science	3	3
AGRI 101—Introduction to Agriculture	1	.
BOTN 100—General Botany	4	.
ZOOL 101—General Zoology	.	4
ANSC 101—Principles of Animal Science	3	.
AGRO 100—Crop Laboratory	.	2
Mathematics	.	3
Health	(2)	.
Arts or Philosophy	.	3
Physical Education	(1)	(1)

TWO-YEAR PROGRAM—INSTITUTE OF APPLIED AGRICULTURE

The programs of study offered by the Institute of Applied Agriculture will assist men and women interested in preparing for specific jobs in the broad fields of applied science and business in agriculture. Curricula currently offered are entitled: business farming, turfgrass and golf course management; ornamental horticulture and nursery management. Courses taken in these programs are not transferable for degree credits at the University of Maryland. However, students satisfactorily completing two years of study will be awarded an appropriate certificate. For additional information write: Director, Institute of Applied Agriculture, University of Maryland, College Park, Md. 20742.

COOPERATIVE EXTENSION SERVICE

Cooperative Extension work, established by State and federal laws in 1914, extends practical information beyond the classrooms of the University of Maryland to young people and adults—both rural and urban—throughout the State of Maryland. Major program areas include agriculture and environment, family living, youth development, and community development.

The educational endeavors of the Cooperative Extension Service are financed jointly by federal, State and county governments. In each county and in Baltimore City there is a competent staff of extension agents assigned to conduct educational work in program areas consistent with the needs of the people of the county and as funds permit. The county staff is supported by a staff of specialists located at the University, and, through their mutual efforts, they assist local people in seeking solutions to their problems.

The Cooperative Extension Service works in close harmony and association with many groups and organizations. In addition to work on farms and with agri-businesses, extension programs are aimed at many rural non-farm and urban family consumers. Thousands of boys and girls gain leadership knowledge and experience and are pro-

vided practical educational instruction in 4-H clubs and other youth groups.

To accomplish its mission, the Cooperative Extension Service works closely with other agricultural divisions of the University and units of the University outside of agriculture, as well as State and federal agencies and private groups. It arranges and conducts thousands of short courses, workshops and conferences in various fields of interest held both on the College Park Campus and at other locations throughout the state. A wide variety of publications and radio and television are used extensively to reach the people of Maryland.

THE AGRICULTURAL EXPERIMENT STATION

The Agricultural Experiment Station serves Maryland agriculture in much the same manner as research laboratories serve large corporations. The problems which face a biological and business undertaking such as agriculture are as numerous and perplexing as the problems of any business.

The station is a joint Federal and State undertaking. Passage of the Hatch Act of 1887, which made available a grant-in-aid to each state for the purpose of establishing an agricultural experiment station, gave a great impetus to the development of research work in agriculture. This work was further encouraged by the passage of the Adams Act in 1906, the Purnell Act in 1925, the Bankhead-Jones Act in 1935, and the Flannagan-Hope Act of 1946.

The work of the Maryland Agricultural Experiment Station, which is supported by these Acts and by State appropriations, centers at College Park. On the University campus are laboratories for studying insects and diseases, soil fertility, botanical problems, and the economics of our agricultural industry and its interrelationship with our total economy. This is also the location of the facilities for the experimental herds programs.

About eight miles from the Campus at College Park, near Beltsville, the Plant Research Farm of 340 acres is devoted to work connected with soil fertility, plant breeding and general crop production problems. An experimental farm near Upper Marlboro is devoted to the problems of tobacco growing and curing. A farm near Salisbury is devoted to solution of the problems of producers of broilers and of vegetable crops in the southern Eastern Shore area. Experimental farms near Ellicott City are devoted to livestock problems and to dairy cattle nutrition and forage research. Also facilities for tests of various crop and soil responses are distributed throughout the State. These different locations provide the opportunity to conduct experiments under conditions existing where the results will be put into practice.

DIVISION OF MATHEMATICAL, PHYSICAL, AND ENGINEERING SCIENCES

The role of the university in society has three closely interrelated parts: education, the search for new knowledge, and specialized service to the community and the nation. The Division of Mathematical, Physical, and Engineering Sciences contributes to all of these functions.

The Division recognizes teaching as its central mission. This includes the teaching of undergraduates, both those within the Division seeking a scientific career and those in other specialties who desire an introduction to the realm of science; the teaching of graduate students, who will become the next generation of teachers and professional scientists and engineers; and teaching at the postdoctoral and research level, for those advanced specialists on their way to assuming major responsibilities at the senior level. The Division provides an intellectual environment that enables each student to realize his potential and that offers flexible educational programs to meet a variety of needs. Research into the improvement of teaching and the development of new curricula will be a continuing activity in the Division.

The search for new knowledge is one of the most challenging activities of mankind. The university is one of the few institutions in society where fundamental research is emphasized. Within the Division of Mathematical, Physical, and Engineering Sciences, research, teaching of the use of research tools, and teaching of the meaning of research in our modern society plays a vital role in programs of higher education.

STRUCTURE OF THE DIVISION

The Division of Mathematical, Physical and Engineering Sciences encompasses the following departments and programs:

1) Within College of Engineering:
   Department of Aerospace Engineering
   Department of Chemical Engineering
   Department of Civil Engineering
   Department of Electrical Engineering
   Fire Protection Engineering Program
   Department of Mechanical Engineering
   Nuclear Engineering Program
   Engineering Materials Program
   Engineering Sciences Program
   Fire Service Extension Department
   Wind Tunnel Operations Department
   Cooperative Engineering Education Program

2) Other Departments and Programs:
   Department of Mathematics
   Department of Physics and Astronomy
   Institute for Fluid Dynamics and Applied Mathematics

Institute for Molecular Physics
Applied Mathematics Program
Astronomy Program
Center of Materials Research
Computer Science Program
Meterology Program
Physical Sciences Program

The College of Engineering encompasses those departments and programs educating students primarily for employment in the Engineering profession. The Dean's office coordinates the activities within the College and advises students in the Engineering Sciences. A description of the engineering curriculum follows.

DIVISIONAL REGULATIONS

At the present time, the Division of Mathematical, Physical and Engineering Sciences is in the process of development. Students who matriculate in the Division prior to publication of a definite statement of Divisional regulations and requirements will be responsible for major, college and university requirements in effect at the time of first registration. Thus, students who choose to major in such Departments as Mathematics or Physics and Astronomy should familiarize themselves with the requirements of the present College of Arts and Sciences to which these Departments now belong. Students who elect Engineering should refer to requirements of the College of Engineering. When the new Divisional requirements and regulations are published students who matriculated prior to that time will have the option of either completing their original programs or transferring to the new programs and requirements which may be developed.

ENGINEERING

THE COLLEGE OF ENGINEERING offers four-year programs leading either to the degree of Bachelor of Science with curriculum designation in Aerospace Engineering, Agricultural Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering, or Fire Protection, or to the degree of Bachelor of Science in Engineering with an Engineering option or an Applied Science option. In addition, each of the foregoing degree programs may be pursued through the five-year Maryland Plan for Cooperative Engineering Education. The engineering programs integrate these elements: (1) basic sciences, including mathematics, physics, chemistry; (2) engineering sciences including mechanics of solids and fluids, engineering materials, thermodynamics, electricity, and magnetism; (3) professional studies in major fields of engineering specialization; (4) liberal arts and social studies in the General Education Program; and (5) certain other required subjects including health and physical activities.

GENERAL INFORMATION

Increasingly, the boundary between engineers and applied scientists or applied mathematicians becomes less distinct. The various branches of engineering similarly interact with each other, as technical problems become more sophisticated, and required a combined attack from several disciplines. The engineer occupies an intermediate position between science and the public, because, in addition to understanding the scientific principles of a situation, he is concerned with the timing, economics and values that define the useful application of those principles.

Each program lays a broad base for *continued learning* after college in professional practice, in business or industry, in public service, or in graduate study and research.

COLLEGE REGULATIONS

1. The responsibility for proper registration and for satisfying stated prerequisites for any course must rest with the student—as does the responsibility for proper achievement in courses in which he is enrolled. Each student should be familiar with the provisions of this catalog, including the *Academic Regulations,* contained in Section I, General Information, and other pertinent regulations.
2. Required courses in mathematics, physics and chemistry have highest priority; and it is strongly recommended that every engineering student register for mathematics and chemistry—or mathematics and physics—each semester until he has fully satisfied requirements of the College of Engineering in these subjects.
3. A student in the College of Engineering has attained junior standing when he has completed a minimum of 56 academic hours toward his degree, including at least 15 credits of mathematics, 8 credits of chemistry, and 10 credits of physics, and possesses the minimum required grade point average to remain in the University.
   A student who has not attained junior standing should not register for upper division courses.
4. To be eligible for a bachelor's degree in the College of Engineering, a student must have an *average* of at least C—2.0—(a) in all subjects applicable to his degree, and (b) in all junior-senior courses in his major department. Responsibility for knowing and meeting all degree requirements for graduation in any curriculum rests with the student.
5. A student in the College of Engineering may audit a course only with the understanding that the course may not be taken for credit subsequent to his registration as audit. He must also have the consent of the department offering the course. Forms requesting permission to

audit courses are available in the Engineering Student Affairs Office, J 1107.

STRUCTURE OF ENGINEERING CURRICULA

Courses in the normal curriculum or program and prescribed credit hours leading to the degree of Bachelor of Science (with curriculum designation) are outlined in the sections pertaining to each department in the College of Engineering. No student may modify the prescribed number of hours without special permission from the dean of his college. The courses in each curriculum may be classified in the following categories:

1. Certain courses required of all undergraduate students in the University. Students who are not specifically exempted are required to register in and successfully complete two prescribed courses in physical education for a total of two semester hours of credit. A health course (2 credits) is also required of all undergraduate men and women.
2. Courses in the General Education Program. These include: English (nine credits), fine arts or philosophy (three credits), history (six credits), and social science (six credits). A listing of specific courses which meet the requirements of the General Education Program are listed elsewhere in this catalog.
3. Courses in the physical sciences—mathematics, chemistry, physics.
4. Collateral engineering courses—engineering sciences, and other courses approved for one curriculum but offered by another department.
5. Courses in the major department.

A student should obtain written approval for any substitution of courses from the department chairman and the dean of his college.

The courses in each engineering curriculum, as classified above, form a sequential and development pattern in subject matter. In this respect, curricula in engineering may differ from curricula in other colleges. Some regulations which are generally applicable to all students (see the *Academic Regulations)* may need clarification for purposes of orderly administration among engineering students. Moreover, the College of Engineering establishes policies which supplement the University regulations.

BASIC FORMAT OF THE FRESHMAN-SOPHOMORE YEARS IN ENGINEERING

The freshman and sophomore years in engineering are designed to lay a strong foundation in mathematics, physical sciences and the engineering sciences upon which the student will later develop his professional program during the upper division (junior and senior) years. The College course requirements for the freshman year are the same for all students, regardless of their intended professional career, and about 75% of the sophomore year course requirements are common, thus affording the student a maximum flexibility in choosing his specific area of engineering specialization. Although the engineering student selects his major field at the start of his sophomore year, this intramural program commonality affords the student the maximum flexibility of choice or interdepartmental transfer up to the end of his sophomore year.

GENERAL COLLEGE REQUIREMENTS FOR THE FRESHMAN AND SOPHOMORE YEARS

	Credit Hrs.
A. Health and Physical Education	
Health (HLTH 105)	(2)
Physical Education (two, one semester courses are required, these carry no academic credit)	(2)
B. General Education	12
C. Mathematics	16
Four courses in mathematics are required to be selected from MATH 140, 141, 240, 241, and 246. If MATH 246 is the last course in the sequence, only 15 credit hours (total) in Math will result and one (1) credit hour is added to the Engineering Sciences or Math and Physical Sciences Electives.	
D. Physical Sciences	19
A minimum of 19 credit hours in Physics and Chemistry must be completed, with not less than seven (7) in either field.	
E. Engineering Sciences	9
Nine (9) credit hours must be completed in the Engineering Sciences, to be selected from ENES 101, or ENES 110, ENES 220 and ENES 221. Each is a three (3) credit hour course.	
F. Engineering Sciences, Mathematics, Physical Sciences or Major Field Engineering	8
Eight (8) credit hours to complete the freshman-sophomore year requirements may be in any of the fields indicated, but no more than six (6) credit hours may have a major field designation.	
Total Minimum Academic Credits in Freshman-Sophomore	66
(Plus 2 semesters of Physical Education)	

BASIC AND ALTERNATE CURRICULA FOR FRESHMEN IN ENGINEERING

All freshmen in the College of Engineering are required to complete the following basic curriculum for freshmen regardless of whether the student plans to proceed through one of the major field designated baccalaureate degree programs or follow any of the multidisciplinary, non-designated degree curricula that are sponsored by the College.

BASIC FRESHMAN CURRICULUM IN ENGINEERING

	Semester	
Course No. and Title	I	II
HLTH 105—Science and Theory of Health	(2)	..
CHEM 103, 104—General Chemistry**	4	4
PHYS 161—General Physics I	..	3
MATH 140, 141—Analysis I, II	4	4
ENES 101—Intro, Engr. Science	3	..
ENES 110—Mechanics	..	3
General Education Courses	3	3
Physical Activities	(1)	(1)
Total Credits	17	18

Students who are not prepared to schedule MATH 140 are required to schedule MATH 115.

Because MATH 115 is a preparatory course it increases the total number of credits required for an engineering degree by 3 credits. Such students will schedule their freshman year as shown in the following:

ALTERNATE FRESHMAN CURRICULUM IN ENGINEERING

Course No. and Title	Semester I	Semester II	Summer
HLTH 105—Science and Theory of Health	(2)		
CHEM 103, 104—General Chemistry**	4	4	
PHYS 161—General Physics I			3
MATH 115—Intro. to Analysis***	3		
MATH 140, 141—Analysis I, II		4	4
ENES 101—Intro. Engr. Science	3		
ENES 110—Mechanics		3	
General Education Courses	3	6	
Physical Activities	(1)	(1)	
Total Credits	16	18	7

THE SOPHOMORE YEAR IN ENGINEERING

With the beginning of his sophomore year the student selects his sponsoring academic department (Aerospace, Agricultural, Chemical, Civil, Electrical, Fire Protection, or Mechanical Engineering), and this department assumes the responsibility for the student's academic guidance, counseling and program planning from that point until the completion of the degree requirements of that department as well as the College.

SOPHOMORE CURRICULUM IN ENGINEERING

	Semester I	Semester II
General Education	3	3
Math 240— Linear Algebra	4	..
Math 241 or 246—Analysis III or Differential Equations	..	3 or 4*
Phys 262, 263—General Physics	4	4
ENES 220—Mechanics of Materials	3*	..
ENES 221—Dynamics	..	3*
Major fie'd or related courses	2 or 4	2 or 5*
Total Credits	16 or 18	15 or 19

* For specific requirements, see the curriculum listing in each engineering department.

** Qualified students may elect to take CHEM 105 end 106 (4 cr. hrs. each) instead of CHEM 103 and 104.

*** MATH 115 is an additional course for those students who do not qualify to begin with MATH 140.

BACHELOR OF SCIENCE DEGREE IN ENGINEERING

The "B.S.-Engineering" program is designed to serve three primary functions: (1) to prepare those students who wish to use the breadth and depth of the engineering education as a preparatory vehicle for entry into post-baccalaureate study in such fields as medicine, law, or business administration; (2) to continue their engineering training in the graduate area of some of the newer interdisciplinary fields of engineering such as environmental engineering, bio-medical engineering, systems engineering, and many others; and finally (3) those students who do not plan the normal professional practice of a designated engineering field upon graduation but wish to use a broader engineering training to serve in auxiliary and supporting aspects of engineering related industries. The program is designed to give the maximum flexibility for tailoring a program to the specific future career plans of the student. To accomplish these objectives, the program has two optional paths: an engineering option and an applied science option.

The "Engineering" option should be particularly attractive to those students contemplating graduate study or professional employ in the interdisciplinary engineering fields such as environmental engineering, bio-engineering, bio-medical engineering, and systems and control engineering, or for preparatory entry into graduate work in materials engineering or nuclear engineering, which are currently offered only at the graduate level at Maryland. For example, a student contemplating graduate work in environmental engineering might combine chemical and civil engineering for his program; a student interested in systems and control engineering graduate work might combine electrical engineering with aerospace, chemical, or mechanical engineering.

The "Applied Science" option should be particularly attractive to those students who do not plan on professional engineering careers, but wish to use the intellectual and developmental abilities of an engineering education as a means of furthering career objectives. Graduates of the Applied Science Option may aspire to graduate work or an ultimate career in a field of science, law, medicine, business, or a variety of other attractive opportunities which build upon a combination of engineering and a field of science. Entrance requirements for Law and Medical Schools can be met readily under the format of this program. In the applied science program, any field in the University in which the student may earn a B.S. degree is an acceptable secondary science field, thus affording the student a maximum flexibility of choice for his personal career planning.

TABLE I shows the *minimum* requirements for B.S.-Engineering degree with either an Engineering option or an Applied Science option. The 66 semester credit hours required for the completion of the Junior and Senior years is superimposed upon the Freshman and Sophomore curriculum of the chosen primary field of engineering. The student, thus, does not make a decision whether to take the designated or the undesignated degree in an engineering field until the beginning of his junior year. In fact, he can probably delay the decision until the Spring term of his junior year with little or no sacrifice, thus affording the student ample time for decision. Either program may be taken on the regular 4-year format or under the Maryland Plan for Cooperative Engineering Education.

JUNIOR-SENIOR REQUIREMENTS FOR THE DEGREE OF B.S.—ENGINEERING

Requirements	Engineering Option	Applied Science Option
General Education	12 sh.	12 sh.
Mathematics, Physical Sciences, required [3]	3 sh.	3 sh.
Engineering Sciences [1 3]	6 sh.[2]	6 sh.
Primary Field [4]	24 sh. (Engr.)	18 sh. (Engr.)
Secondary Field	12 sh. (Engr.)	12 sh. (Science)
Approved Electives [3 6]	9 sh. (Technical)	12 or 13 sh.
Sr. Research/Project [5]		2 or 3 sh.
	66	66

Engineering Fields of Concentration available under the B.S.-Engineering program as primary fields within either the Engineering option or the Applied Science option are as follows:

Aerospace Engineering
Agricultural Engineering
Chemical Engineering
Civil Engineering
Electrical Engineering
Engineering Materials
Fire Protection
Mechanical Engineering
Nuclear Engineering

In addition, the field of Fire Protection is available within the applied science option as a primary field. All engineering fields of concentration may be used as a secondary field within the engineering option.

GENERAL REQUIREMENTS FOR THE B.S.-ENGINEERING DEGREE

All undergraduate students in engineering will select their major field sponsoring department at the beginning of their second year regardless of whether they plan to proceed to a designated or an undesignated degree. A student wishing to elect the undesignated degree program may do so at any time following the completion of his sophomore year, or a minimum of 50 earned credits towards any engineering degree, and at least one semester prior to the time he expects to receive the baccalaureate degree. As soon as the student elects to seek an undesignated baccalaureate degree in engineering, his curriculum planning, guidance and counseling will be the responsibility of the "Undesignated Degree Program Advisor" in his primary field department. At least one semester before the expected degree is to be granted, the student must file an "Application for Admission to Candidacy for the Degree of Bachelor of Science in Engineering" with the Dean's Office of the College of Engineering. The candidacy form must be approved by the chairman of the primary field department, the primary engineering and the secondary field advisors and the college faculty committee on "Undesignated Degree Programs." This committee has the responsibility for implementing all approved policies pertaining to this program and reviewing and acting on the candidacy forms filed by the student.

Specific University and College academic regulations apply to this undesignated degree program in the same manner as they apply to the conventional designated degree programs. For example, the academic regulations of the University apply as stated in the College Park Catalog of the University of Maryland, and the College requirement of 2.00 factor in his major field during the junior and senior years apply. For the purpose of implementation of such academic rules, the credits in the primary engineering field and the credits in the secondary field are considered to count as "the Major" for such academic purposes.

(1) Engineer sciences. for the purpose of this degree, are those courses in the Engineering College prefixed by ENES, or, are in an engineering field not his primary or secondary field of engineering concentration.

(2) Students following the "Engineering" option may use up to six (6) sh. of course work number 200 and below in his primary or his secondary field of engineering concentration as an engineering science.

(3) A minimum of 50% of the course work in the mathematics, physical sciences, engineering sciences or elective areas must be at the 300 course level (number) and above.

(4) All of the courses used to fulfill the fields of concentration requirements (36 sh. in the engineering option and 30 in the applied science option) must be at the 300 course level (number) and above.

(5) For the applied science option each student is required—unless specifically excused, and if excused, 15 sh. of approved electives will be required—to satisfactorily complete a senior level project or research assignment relating his engineering and science fields of concentration.

(6) In the Engineering option, the 9 sh. of electives must be technical (math, physical sciences, or engineering sciences but may not be in the primery or secondary fields of concentration). In the Applied Science option, the approved electives should be selected to strengthen the student's program, consistent with his career objectives. Courses in the primary or secondary fields of concentretion may be used to satisfy the approved electives requirement.

ENVIRONMENTAL ENGINEERING

Environmental engineering is the application of basic engineering and science to the problems of our environment to ensure optimum environmental quality. In recent years, man has suffered a continually degrading environment. A truly professional engineer involved in the study of environmental engineering must see the total picture and relate it to his particular mission whether this be air pollution, water quality control, environmental health or solid and liquid waste disposal. The total picture includes urban systems design, socio-economic factors, regional planning, transportation, recreation, water resource development, and land and resource conservation.

A student who selects the B.S.-Engineering degree program can specialize in environmental engineering by proper selection of primary and secondary fields from the wide selection of courses related to environmental engineering given by the various departments in the college.

ENGINEERING-MEDICINE

Engineering has become an integral part of the medical profession. Heart pumps, synthetic kidneys, heart-lung machines, and artificial organs are a few of the advancements in medical technology developed by teams of engineers and physicians. Diagnostic procedures have been greatly enhanced by the use of computers and electronic testing machines. The physician who has an engi-

neering background is in a better position to communicate and work with engineers on medical technological development.

The Bachelor of Science in Engineering degree provides an excellent opportunity for a student to meet the entrance requirements for medical school while earning an engineering degree.

The above examples of environmental engineering and engineering-medicine are only two applications of the Bachelor of Science in Engineering degree program. Many other examples could be listed. Students interested in a flexible curriculum in engineering should give consideration to this program.

COGNATE ACTIVITIES

Departments in the College of Engineering which contribute significantly to activities in education, research and professional service include the Department of Wind Tunnel Operations and the Fire Service Extension Department These departments work closely with academic departments of the University in areas of common interest. The scope of work in each department area is outlined briefly in paragraphs which follows.

Fellowship grants and contracts for fundamental research contribute to the overall professional-scientific activity of the staff of the College. The staff of the College of Engineering available for research studies will be glad to discuss proposed problems of importance to industry and of public interest where means can be found for the co-operative researches; such studies may be undertaken with the approval of the administration of the University.

WIND TUNNEL OPERATIONS DEPARTMENT

The Wind Tunnel Operations Department conducts a program of experimental research and development in cooperation with the aircraft industry, agencies of government and other industries with problems concerning aerodynamics. Testing programs cover a variety of subjects including all types of aircraft, ships, parachutes, radar antennas, trucks, automobiles, structures, and exterior equipment subject to high winds.

The Department has a 7.75x11-foot wind tunnel that can be operated at speeds from 0 to 240 mph. This facility has powered model drive equipment, and auxiliary vacuum and high pressure air supplies for boundary layer control studies. Supporting shops include complete woodworking, machine shop, photographic, and instrumentation facilities.

The full-time staff of the department includes engineering, computing, shop, and technical operations personnel. This staff cooperates with other faculty and students in the College of Engineering on problems of mutual interest.

FIRE SERVICE EXTENSION DEPARTMENT

The Fire Service Extension Department provides in-service training for volunteer, municipal and industrial fire fighters, officers, rescue and ambulance personnel and serves in an advisory capacity in matters of fire prevention, fire protection, fire safety regulations, and emergency care. Classes are conducted throughout Maryland by local instructors who work under the guidance of senior instructors of the department. Basic training is given in the fundamentals of firemanship. An advanced course covers the technical field of fire prevention, control and extinguishment. Specialized courses are offered for fire officers in tactics, strategy of fire suppression and in fire department administration. A training course of 42 clock hours for heavy duty rescue operations is also available. An increasingly important program is that of establishing and improving fire prevention and fire protection in Maryland industry, institutions and mercantile establishments.

Emergency care courses incorporating the latest techniques in the treatment of the sick and injured are now made available through the department. Short courses in specialized subject areas, such as instructor training, hydraulics, fire pumps, aerial apparatus, and industrial fire protection are conducted at the University at different times throughout the year.

Additional information may be obtained from the Director, Fire Service Extension Department, University of Maryland, College Park, Md. 20742.

CO-OPERATIVE ENGINEERING EDUCATION PROGRAM

The Maryland Plan for Co-operative Engineering Education at the University of Maryland, offered by the College of Engineering, presents a five-year program leading to a Bachelor of Science degree. The academic requirements for students following the Co-op Plan of Education are identical to the academic requirements for those students following the regular four-year program. In addition to the normal academic requirements, the Co-op student has scheduled periods of professional internship which must be satisfactorily completed to qualify for the baccalaureate degree under the Co-op Plan.

The Co-op Plan begins after the student has completed the freshman and sophomore requirements of his major field. This Co-op Plan involves only the last half of the student's baccalaureate program, the junior and senior years. The alternating plan of study and professional internship lengthens this normal two-year period to three calendar years. Delaying entry into the Co-op Plan until the junior year offers considerable educational advantages to the student. The student retains the normal freshman-sophomore program years to afford time for the selection of his major field of engineering . . . or even whether he wishes to con-

tinue in engineering . . . without committing himself to either the regular four-year or the Co-op Plan of education. A more mature and meaningful series of professional internship assignments are possible, to benefit both the student and his professional partner. Also, the plan is readily adaptable to the needs of the student transferring to the University from the engineering transfer programs of the community colleges.

Students are selected for the Co-op Plan from applications filed with the Co-operative Education Office of the College of Engineering. While the student applies during his sophomore year, he must have completed the sophomore year requirements before formal entry into the program. A student must have a minimum 2.0 grade point average at the University of Maryland in order to qualify for the program.

The Maryland Plan for Co-operative Engineering Education is shown in the tabulation below. Briefly, in Plans I and II, the Co-op student spends three semesters and two summers in resident study and three semesters and one summer in professional internship (70 weeks) to complete his baccalaureate degree requirements; all students complete the program with student-residence at the University. In these two plans students begin interning during the spring and fall semesters respectively. In Plan III the Co-op student begins interning in the summer and spends three semesters and one summer in resident study and two semesters and two summers in professional internship (60 weeks). The study-residence periods are the normal semester or eight-week summer sessions at the University; the internship periods are of twenty-weeks duration during the fall and spring semesters and ten weeks during the summer. It should be emphasized that these plans are guides, and some variation is permissible.

Note: The student must have completed all freshman and sophomore requirements of his major field before entry into the Co-op Plan.

	Plan I	Plan II	Plan III
SUMMER	——	——	Intern (1)
FALL	Study	Intern (1,2)	Study
SPRING	Intern (1,2)	Study	Intern (2,3)
SUMMER	Study	Intern (3)	Study
FALL	Intern (3,4)	Study	Intern (4,5)
SPRING	Study	Intern (4,5)	Study
SUMMER	Intern (5)	Study	Intern (6)
FALL	Study	Intern (6,7)	Study
SPRING	Intern (6,7)	Study	——
SUMMER	Study	Study	——

Students make their own arrangements for board and lodging while on their periods of internship. Frequently the participating industrial company or governmental agency will assist the student in locating good, inexpensive lodging. The internship wages are paid directly to the student by his employer.

During the semesters or summer sessions in which the student attends school, he pays the regular tuition and fees assessed by the University. A $30.00 fee is charged for each 10-week period of professional internship. There is one 10-week period when a student interns during the summer and three double periods (20 weeks each) when he interns during the fall or spring semesters. The professional intern fee is payable at the beginning of each intern period and is not refundable.

DIVISION OF BEHAVIORAL AND SOCIAL SCIENCES

The Division of Behavioral and Social Sciences will consist of faculty and students who are involved in research and teaching relating to the analysis and solution of behavioral and social problems. The Division, organized in 1972, will contain academic departments which were formerly administered by the College of Arts and Sciences and the College of Business and Public Administration, in addition to a new College of Business and Management.

The Division is designed to extend and support learning in the traditional disciplines while creating conditions for the development of interdisciplinary approaches to recurring social problems. Divisional students might choose to concentrate their studies in the traditional fields, or may be interested in focusing on interdisciplinary study. As part of its response to society's need for resolution of the ever more complex problems of modern civilization, the University must promote the utilization of knowledge generated by a cross-fertilization of disciplines. The Division will facilitate the grouping and regrouping of faculty across disciplinary lines for problem-oriented research and teaching. The interaction of faculty and students in overlapping fields will be encouraged and supported.

In order to promote the exchange of ideas, education, and knowledge, each unit of the Division, including the College of Business and Management, will be concerned with both applied and theoretical aspects of the resolution of social problems. Practicums and internships will be utilized increasingly for the purpose of relating theoretical and empirical concepts in pursuit of the Division's concern with conditions in society.

The units in the Division are:

I. The College of Business and Management
II. Afro-American Studies Program
III Anthropology Program
IV. Department of Economics
V. Department of Geography
VI. Department of Government and Politics
VII. Department of Information Systems Management
VIII. Department of Hearing and Speech Sciences

IX. Department of Sociology
X. Department of Psychology
XI. Institute of Criminal Justice and Criminology
XII. Institute of Urban Studies
XIII. Linguistics Program

In addition to these departments, programs, and institutes, the Division includes the Bureau of Business and Economic Research and the Bureau of Governmental Research.

The new Division of Behavioral and Social Sciences and its constituent College of Business and Management are presently in a formative stage. Until regulations concerning admission and degree requirements of the Division and new College have been developed and approved the academic regulations of the College of Business and Public Administration shall remain in effect. For convenience, information and regulations of the College of Business and Public Administration are given below.

When regulations of the new Division and College are published in the future all students who matriculated in departments originally in the College of Business and Public Administration or in departments in the College of Arts and Sciences shall have the option of completing their degrees under regulations and requirements in force when they began or of electing the new requirements.

REGULATIONS OF THE COLLEGE OF BUSINESS AND PUBLIC ADMINISTRATION

(With the reorganization of the College Park Campus this College will become part of the Division of Behavioral and Social Sciences.)

THE COLLEGE OF BUSINESS AND PUBLIC ADMINISTRATION is ideally located to serve students interested in economics, geography, information systems management, and political science. Downtown Washington is only 25 minutes away in one direction, while the Baltimore business district is less than an hour in the other. There is frequent transportation service from College Park to each city. Qualified students may obtain a first-hand view of the far-flung economic and political activities of the national government and may utilize the libraries and other facilities available in Washington.

The college's five instructional departments offer a broad range of curricula in professional fields and in social science disciplines. The separate programs of study frequently draw upon courses in complementary fields within the college. The five departments and the major departmental offerings are:

I. Department of Business Administration
   1. The General Curriculum in Business Administration
   2. Accounting
   3. Finance
   4. Marketing
   5. Personnel and Industrial Relations
   6. Production Management
   7. Management Science—Statistics
   8. Transportation
   9. Combined Business Administration and Law
II. Department of Economics
III. Department of Geography
IV. Department of Government and Politics
   1. General Curriculum in Government and Politics
   2. International Affairs
   3. Public Administration
V. Department of Information Systems Management

In addition to these five departments, the College includes the Bureau of Business and Economic Research and the Bureau of Government Research.

ENTRANCE REQUIREMENTS

Requirements for admission to the college are those of the University.

To assure a likelihood of success in the college, it is recommended that the student have four units of English, three or more units of college preparatory mathematics—including a *minimum* of two units of algebra and one unit of geometry, one or more units of history and social science, two or more units of natural science, and two or more units of foreign language. Students expecting to enroll in the College of Business and Public Administration should pursue the precollege program in high school.

STATEMENT OF POLICY ON THE TRANSFER OF CREDIT FROM OTHER INSTITUTIONS

The College of Business and Public Administration subscribes to the policy that a student's undergraduate program, below his junior year,* should include no advanced, professional-level courses. This policy is based on the conviction that the value derived from these advanced courses is materially enhanced when based upon a sound foundation in the liberal arts

In adhering to the above policy, it is the practice of the College of Business and Public Administration to accept in transfer from another accredited institution no more than 12 semester hours of work in Business Administration courses when they have been taken as part of a curricular program below the junior year. Similar limitations may be placed upon the transfer of credit in other professional areas.

*The term "below the junior year" is defined as that period of collegiate enrollment wherein a student has accumulated sixty, or fewer, semester hours of transferable academic credit.

The 12 semester hours of Business Administration acceptable in transfer are specifically identified as three (3) semester hours in an introductory business course, three (3) semesters hours in business statistics, and six (6) semester hours of elementary accounting. In addition, a single course in data processing may be considered for transfer, but only for *elective credit*. Thus, it is anticipated that the student transferring from another institution will have devoted the major share of his academic effort, below the junior year, to the completion of basic requirements in the liberal arts.

DEGREES

The University confers the following degrees on students completing programs of study in departments of the College: Bachelor of Science, Master of Arts, Master of Business Administration, Doctor of Business Administration, and Doctor of Philosophy. Each candidate for a degree must file in the Registrations Office on a date announced for each semester a formal application for a degree. Candidates for degrees must attend a convocation at which degrees are conferred and diplomas are awarded.

JUNIOR STANDING

A student is permitted to register for upper division courses when granted Junior Standing by his college. The permission will be based upon earning a minimum of 56 academic hours toward his degree, completing such course requirements as the college may direct, and possessing the minimum required grade point average to remain in the University.

GRADUATION REQUIREMENTS

A minimum of 120 semester hours of credit with an average of C in addition to the specified courses in physical activities and health are required for graduation. *A minimum of 57 hours of the required 120 hours must be in upper division courses, with the exception that the student may, with the consent of the dean, offer certain lower division courses in mathematics, natural science and foreign language in partial fulfillment of the requirement.* Usually the departments within the College will require that the student have, in addition to an overall C average, an average of C or better in those courses comprising the student's departmental area of study. The time normally required to complete the requirements for the bachelor's degree is eight semesters.

SENIOR RESIDENCE REQUIREMENT

All candidates for degrees should plan to take their senior year in residence since the advanced work of the major study normally occurs in the last year of the undergraduate course. At least 24 of the last 30 credits must be done in residence, i.e., a student who at the time of his graduation will have completed 30 semester hours in residence may be permitted to do no more than 6 semester hours of his final 30 credits of record in another institution or to include not more than 6 semester hours of credit earned by advance standing examination, provided he secures permission in advance from his dean. The student must be enrolled in the college from which he plans to graduate when registering for the last 15 credits of his program. These requirements apply also to the third year of preprofessional combined degree programs.

HONORS

THE DEAN'S LIST OF DISTINGUISHED STUDENTS

Any student who has passed at least 12 hours of academic work in the preceding semester, without failure of any course, and with an average grade on all courses of at least 3.5 will be placed on the Dean's List of Distinguished Students.

BETA GAMMA SIGMA

The Alpha of Maryland Chapter of Beta Gamma Sigma was chartered in 1940. The purpose of this honorary society is to encourage and reward scholarship and accomplishment among students of commerce and business administration; to promote the advancement of education in the art and science of business; and to foster integrity in the conduct of business operations. Chapters of Beta Gamma Sigma are chartered only in schools holding membership in the American Association of Collegiate Schools of Business. Third and fourth year students in business administration are eligible; if in his third year, a student must rank in the highest four percent of his class, and if his fourth year, he must rank in the highest ten percent in order to be considered for selection.

THE DELTA SIGMA PI SCHOLARSHIP KEY

This is awarded annually to the student who has maintained the highest scholastic standing during the entire course of study in business administration or economics. Delta Sigma Pi was founded at New York University on November 7, 1907. The Gamma Sigma of Maryland chapter was chartered at the University in 1950. Delta Sigma Pi is a professional fraternity organized to foster the study of business in universities; to encourage scholarship, social activity, and the association of students for their mutual advancement by research and practice; to promote closer affiliation between the commercial world and students of commerce; and to further a higher standard of commercial ethics and culture, as well as the civic and commerical welfare of the community. Members are selected from the College of Business and Public Administration on the basis of leadership, scholastic standing and promise of future business success.

KAPPA TAU ALPHA

The Maryland chapter of Kappa Tau Alpha was chartered in 1961. Founded in 1910, this national honorary society has 39 chapters at universities offering graduate or undergraduate preparation for careers in professional journalism. It is dedicated to recognition and promotion of scholarship in journalism. Among its activities is an annual award for an outstanding piece of published research in journalism and mass communications. (Also see College of Journalism)

THE DIVISION OF ARTS AND HUMANITIES

The Division of Arts and Humanities offers its students a variety of educational opportunities. In addition to the traditional liberal education associated with humanistic studies the student is offered the opportunity of majoring in a chosen discipline. This element of depth serves both as an integral part of the student's education and as a foundation for further professional training or pursuits.

Students majoring in the Arts may elect either a humanistically oriented program or a highly professionally oriented program in one of the creative and/or performing areas. The creative and performing artist holds a key role in the cultural studies and development of a university. Therefore, special consideration for these varied needs and interests is essential.

The Division of Arts and Humanities offers possibilities for the development of a variety of multi- or interdisciplinary studies, independent and general study programs and special intensive programs designed for individual student needs; the latter possibly certificated by individual academic departments, schools or the division. This diversity, enhanced by the divisional structure, is essential to the growth of a modern university. In addition to its major programs the division serves students from the entire campus who wish to take courses in the arts and humanities.

This division is an outgrowth of the proposals for academic reorganization which were approved by the Campus Senate and the Board of Regents in 1971-72. Originally, there were the Division of Language and Literature, the Division of Applied Science, and the later School of Liberal Arts of Maryland State College. In 1921 the School of Liberal Arts and the School of Chemistry were combined and other physical and biological sciences were brought into the newly formed College of Arts and Sciences. In later reorganizations, some departments were added and others transferred to the administrative control of other colleges. The departments of Botany, Economics, Geography, and Government and Politics, although administratively in the Division of Behavioral and Social Sciences, or the Division of Life Sciences and Agriculture, offer courses for Arts and Humanities students. Under the divisional arrangement it is anticipated that majors or combined majors may be elected in these departments as in those administered by the Division of Arts and Humanities.

ADMISSION

At the present time the Division of Arts and Humanities is still in its formative stage and special requirements for admission have not been determined. In general, the requirements for admission will be the same as those for admission to the other academic divisions, colleges and schools of the university. Future campus catalogs and special bulletins from the division will add pertinent information. Application must be made to the Director of Admissions, University of Maryland, College Park, Maryland 20742.

The student who intends to pursue a program of study in the Division of Arts and Humanities should include the following subjects in a high school program: English, four units; College Preparatory Mathematics (Algebra, Plane Geometry), three or four units; Foreign Language, two or more units; Biology, Chemistry or Physics, two units; History and Social Sciences, one or more units. However, students who lack such preparation should not be discouraged automatically from investigating the possibility of enrolling in the division. Its goals include continuing education toward enhancement of the quality of intellectual and cultural life for all who have the capacity and motivation to participate. In addition to the preparation described above, an essential preparation for all students is the cultivation of a broad reading experience. Since knowledge is gained in many ways, every effort will be made to give due recognition for independent accomplishment. Students who wish to pursue study in the creative and performing arts must seek to develop necessary skills to the greatest extent possible before application. The special skills and materials associated with the arts make a considerable training and experience prior to college absolutely essential if the student wishes to enroll in the professional degree programs offered in the arts. Students applying for entrance to these programs may be required to audition, present slides or a portfolio as a part of the admission requirements. Students who wish to major in the sciences, pre-medicine or pre-dentistry, formerly in the College of Arts and Sciences, should consult the other divisions for the appropriate registration.

DEGREES

Students of this division who satisfactorily complete curricula with majors in departments of the humanities and fine arts are awarded the degree of Bachelor of Arts. Those who complete satisfactorily a special professional program in the Department of Music are awarded the degree of Bachelor of Music. Future bulletins should be

consulted for the announcement of additional degree programs.

GENERAL AND DIVISIONAL REQUIREMENTS FOR DEGREES

At the present time special requirements of the Division of Arts and Humanities have not been formulated. Until such time as divisional requirements are announced the existing requirements of the College of Arts and Sciences will remain in effect. For convenience, these requirements are given below. If the divisional requirements change, all students enrolled in the Division of Arts and Humanities will have the option of either continuing under requirements which existed at the time of entrance or changing to the new requirements. When the College of Arts and Sciences is officially dissolved, students who were registered in the College prior to that date will be able to complete degree programs offered by the College.

The baccalaureate degree from the College of Arts and Sciences, or the Division of Arts and Humanities at the present time, may be conferred upon a student who has satisfied the following requirements:

1. General Education Requirements.
2. College of Arts and Sciences requirements.
3. Major department requirements.
4. Completion of a minimum of 120 academic credits (not including, under the present General Education Program, required physical education and Health 105) with at least a C average.

COLLEGE REQUIREMENTS

These requirements as indicated above are to apply until new policies of the Division of Arts and Humanities are published.

The college requires a certain degree of exposure to, and hopefully proficiency in, the knowledge of a language and culture of some country other than Anglo-American. This may be met in several ways:

1. a) A student who has successfully completed at least through *"level 3"* of one foreign language at the high school level, or
   b) A student who has successfully completed at least two years *("level 2")* of *two* different foreign languages at the high school level need not take additional foreign languages at the college level to satisfy the requirements of the college.
2. A student who does not meet the requirements under paragraph 1, must show proficiency through the intermediate level of college language. This may be done as follows:
   a) Take the placement examination in the language in which he has background—two years in high school—and begin at the college level indicated by the test and continue through the intermediate level; or
   b) Pass the proficiency test for intermediate level given by the respective language departments.

Referring to paragraph 1, the following should be noted:

a) Certain departments still require language at the college level to fulfill major requirements. Also, certain honor societies still require language at the college level among the requirements for selection to membership; in many graduate programs, proficiency in foreign languages is still required while the requirement for professional schools varies, and *it becomes the responsibility of the student* to meet the requirements of the school of his choice.

b) In interpreting this paragraph, the college accepts the information that appears on his high school transcript at the time the student registers for his first semester in the University.

At the present time, the languages which may be offered to meet this requirement are Chinese. French, German, Greek, Hebrew, Italian, Japanese, Latin, Portuguese, Russian, Spanish, and Swahili.

Foreign students may satisfy this requirement by offering twelve hours of English in addition to the regular English requirement. A foreign student may not meet the foreign language requirement by taking freshman or sophomore courses in his native language.

Normally a student shall not be permitted to repeat a foreign language course below Course 200 for credit if he has successfully completed a higher numbered course than the one he wishes to repeat. Credit (including elective credit) will be given for the first semester of a language only if credit has been earned in additional courses in the same language.

2. SPEECH. If a student has had one full unit of public speaking in high school covering an entire academic year, he is not required to take a speech course at the college level, though he may elect to do so.

Those students who need to take speech at the college level to complete the one-semester requirement may choose one course from the following: SPCH 100, 107, 125, or 220. In certain situations other courses may be substituted: i.e., pre-law students may take SPCH 230, and foreign students should take SPHR 202, Fundamentals of American Speech.

3. MAJOR AND SUPPORTING COURSE REQUIREMENTS. Specific descriptions of the departmental, inter-departmental, or pre-professional majors are found, in alphabetical order, along

with the course offerings in the following section of this catalog. The general college regulations controlling majors (and supporting courses) are as follows.

Each student chooses a field of concentration (major). He may make this choice as early as he wishes; however, once he has earned 56 hours of acceptable credit he *must* choose a major before his next registration.

In programs leading to the baccalaureate degree, the student must also have a secondary field of concentration (supporting courses). The courses constituting the major and the supporting courses must conform to the requirements of the department in which the work is done.

The student must have an average of not less than C in the introductory courses in the field in which he intends to major.

A major shall consist, in addition to the underclass departmental requirements, of 24-40 hours, of which at least twelve must be in courses numbered 300 or 400 and at least twelve of which must be taken in the University of Maryland.

Each major program includes a group of "supporting courses," formerly called minors, that are designed to contribute to a better understanding of the major. The nature and number of these courses are under the control of the major department. Except in certain specialized curricula approved by the dean, not more than one-half of the supporting courses may be taken outside of the College of Arts and Sciences.

The average grade of the work taken for the major must be at least C; some departments will count toward satisfaction of the major requirement no course completed with a grade of less than C. The average grade of the work taken in the major and supporting courses combined must be at least C. A general average of C in courses taken at the University of Maryland is required for graduation.

Courses taken to fulfill the requirements in General Education may not be used toward major or supporting courses requirements.

JUNIOR REQUIREMENTS

To attain junior standing, a student must acquire a minimum of 56 academic* semester hours and be eligible to re-register in the University.

NORMAL LOAD

A minimum of 120 semester hours credit, *exclusive of required courses in physical activities and health,* is required for graduation. The normal load for students in this college is 15 semester hours credit per semester, exclusive of the required work in physical activities and health.

A student must have the approval of his advisor and dean to take more than the normal program prescribed in his curriculum.

ADVISORS

Each freshman in this college will be assigned to a faculty advisor who will help the student, during his first year, to select his courses and to determine what his field of major concentration should be.

The student at the sophomore level and above will be advised by a faculty member in his major department. Students following the three-year programs in dentistry, law, and medicine will be advised by special advisors for these programs.

ELECTIVES IN OTHER SCHOOLS AND COLLEGES

A limited number of courses taken in other colleges and schools of the university may be counted for *elective* or supporting credit toward a degree in the College of Arts and Sciences. The number of credits which may be accepted from the various colleges and schools is as follows: College of Education—24; all other colleges or independent departments—20. The combined credits from other colleges and schools shall not exceed 20 (or 24 if courses in education are included). Courses taken in professional schools are not accepted towards a degree in this College.

CERTIFICATION OF HIGH SCHOOL TEACHERS

If courses are properly chosen in the field of education, a prospective high school teacher can prepare for high school positions, with a major and supporting courses in certain of the departments of this college. A student who wishes to work for a teacher's certificate must consult the College of Education in the second semester of his sophomore year and apply for admission to the "Teacher Education" program.

HONORS

The aim of the College Honors Programs is to recognize and encourage superior scholarship. To this end, Honors work offers the gifted student challenging opportunities to work in small groups with carefully chosen instructors and to move at a speed appropriate to his capacities in an atmosphere conducive both to independent study and to growth in intellectual maturity. The college conducts both General and Departmental Honors Programs spanning the four undergraduate years. The General Honors Program is discussed in the Department Section under "Honors Program."

For information concerning the Departmental Honors Programs, consult the various departmental entries in this catalog. It may, however, be remarked that the Departmental Honors Programs are administered by a Honors Committee within each department. Admission to a Departmental

* Not including Health 105 and required PHED.

Honors Program ordinarily occurs at the beginning of the first or second semester of the student's junior year. As a rule, only students with a cumulative grade point average of at least 3.0 are admitted. A comprehensive examination over the field of his major program is given to a candidate near the end of his senior year. On the basis of the student's performance on the Honors Comprehensive Examination and in meeting such other requirements as may be set by the Departmental Honors Committee, the faculty may vote to recommend the candidate for the appropriate degree with (departmental) HONORS, or for the appropriate degree with (departmental) HIGH HONORS. Successful candidacy will be symbolized by appropriate announcement in the commencement program and by citation on the student's academic record and diploma.

Students in the General and Departmental Honors Programs enjoy some academic privileges similar to those of graduate students.

PHI BETA KAPPA

Phi Beta Kappa is the oldest and most widely respected honorary fraternity in the United States. Invitation to membership is based not only on outstanding scholastic achievement, but also on breadth of liberal arts studies completed while enrolled at the University of Maryland. Gamma of Maryland chapter has liaison faculty members in the various departments in the College of Arts and Sciences with whom students may discuss membership selection. It should be kept in mind that requirements for national honorary societies, such as completion of language courses, often differ from the local college or university requirements.

COLLEGES, SCHOOLS AND PROGRAMS OF THE DIVISION

COLLEGE OF JOURNALISM

The College of Journalism at the University of Maryland stands at the doorstep of the nation's capital and the world's news center. It is an ideal location for the study of journalism, public relations, and mass communications because many of the world's important journalists, great news events, and significant communications activities are near at hand.

The College is within easy reach of four of the nation's top 20 newspapers: the *Baltimore Sun,* the *Washington Post,* the *Washington Evening Star,* and the production offices of the *Wall Street Journal.* The College also has easy access to the Washington press corps—the large bureaus of the Associated Press, United Press International, *New York Times,* and many other American and foreign newspapers; also major networks and broadcasting news bureaus such as NBC, CBS, and ABC; also news, business, and special interest magazines, and representatives of the book publishing industry.

The College is close to the sources of news, including the White House, executive departments and agencies, Supreme Court, and Congress. It is near many major non-governmental representative bodies such as associations, scientific and professional organizations, foreign representatives, and international agencies.

The College has six primary objectives: 1) to insure a liberal education for journalists and mass communicators; 2) to provide professional development, including training in skills and techniques necessary for effective communication; 3) to increase public understanding of journalism and mass communication; 4) to advance knowledge through research and publication; 5) to raise the quality of journalism through critical examination and study; and 6) to provide continuing relationship with professional journalists and their societies.

The College curriculum in news editorial journalism is accredited by The American Council on Education for Journalism. The College is a member of The American Association of Schools and Departments of Journalism, The Association for Education in Journalism, and The American Society of Journalism School Administrators.

Student journalism organization chapters include Sigma Delta Chi, Theta Sigma Phi, Pi Delta Epsilon, Kappa Tau Alpha, Kappa Alpha Mu, and a charter chapter of the Public Relations Student Society of America.

The College offers specialized work in news reporting and editing, public relations, advertising, news broadcasting, news photography, and communication theory and research.

The College maintains close liaison with student publications and communications, including the student daily newspaper, yearbook, feature magazine, course guide, literary magazine, campus radio station, and campus television workshop.

The College also provides summer internships in professional work and part-time on-the-job training opportunities.

Advanced students in news reporting may work in Washington as correspondents for participating newspapers in the Maryland-Delaware-D.C. Press Association. Students in this advanced program cover the White House, Congress, government agencies and departments for publication.

Students may declare their intention to major in journalism at the beginning of any semester. but normally this is done before their junior year. Students select and work with one faculty member as their advisor during the course of their study at the University.

Typing ability and English proficiency are required of all students. Majors must maintain a C average in courses taken in the College. Students must receive at least a C in Journalism 200 and

201 before they will be allowed to major in Journalism.

SCHOOL OF ARCHITECTURE

THE SCHOOL OF ARCHITECTURE offers a five-year undergraduate professional program leading to the degree, Bachelor of Architecture. Future plans include development of other environmental design programs at the graduate and undergraduate level.

The school is following established procedures of the National Architectural Accreditation Board, and it is anticipated that it will be accredited in accordance with policies of the NAAB, insuring that present and future students will be eligible for registration in all 50 states upon meeting experience requirements and passing the standard examination. The school is an associate member of the Association of Collegiate Schools of Architecture, and is assigned to that organization's Northeastern Region.

The curriculum presents the basic requisite skills and the opportunity to develop the knowledge to begin professional work. The school's goal is to prepare students for professional service in helping ameliorate the nation's environmental problems.

OPPORTUNITIES IN ARCHITECTURE

A rapidly expanding population, together with rapidly developing industrial civilization, has taxed the resources of cities throughout the world. Large segments of these urban populations are overcrowded, underserviced and deprived of many of the amenities which city life historically symbolizes. Many cities find themselves on the edge of economic, political and social disaster. Whole ethnic, racial and economic groups live in a continuing situation of environmental frustration. This urban crisis, which has come to fruition over the last generation, promises to dominate our domestic life in the United States for at least the generation to come.

The very complexity of these problems, precluding easy attribution of causes and obviating simple solutions, has generated great changes in the environmental design professions and in the other social disciplines. Where they once stood apart, they are now committed to a common purpose. Each of them has had to broaden its vision of service and concern, and has come to recognize the worth and value of the techniques and insights of the others.

In architecture, these exchanges have influenced the procedures, scope and services and goals of the profession. Recent years have seen the introduction of the ideas of urban sociology and the behavioral sciences into the area of professional concern, of the inclusion into professional procedures of linear programming, computer technology, operations research, mathematical and gaming simulation, and the use of analogue models. The scope of architectural services, once confined to the design of and supervision of construction of buildings, has been broadened to include programming, developmental planning, operations research, project feasibility studies and other new professional activities. Finally, the role of the architect is expanding from a narrow concern with building design to a broad concern for developmental change, and his goal has developed from a preoccupation with beauty to a commitment to contributing to the enhancement of the quality of life.

These observations indicate both the great need for educated and trained professionals, and the relevancy and excitement which characterize the profession today. Perhaps at no time in history has architecture posed as great a challenge, nor offered so great a promise of personal fulfillment to its successful practitioners. There are many opportunities for employment and careers in architectural practice. Additional education and experience also qualify a graduate for a career in city or regional planning.

Moreover, the general nature of an architectural education is such that some graduates elect and achieve successful careers in related fields in civil service, commerce or industry.

THE CURRICULUM

The program permits students to enter the School of Architecture either directly from high school or after one year of general college work without extending the time required for completion of degree requirements.

Students in the first year may take an introductory course in the history of architecture as well as general courses. In the second year, the student begins his professional education in the basic environmental design studio course as well as continuing his general education. The basic environmental design studio explores specific architectural problems as well as the general problems inherent in making objects and making spaces. In the third year, coordinated courses in design and building systems introduce the student to the ecological, physiographic, physiological, social, and physical generators of archtecture design; and the student is given an introduction into building technology. In the fourth year, this process is continued, but the emphasis is on urban design factors: the environmental context, the historical and situation context, urban systems, and theoretical, aesthetic and sociological considerations. In the fifth year of design, the student is offered an opportunity to choose a comprehensive topical problem from several offered each year, including special studies in technical areas as well as building design and case studies in urban planning.

All of the design studio courses emphasize en-

vironmental design problem solving experiences to advance the student's skill in the field, as well as lectures, reading assignments, field trips, etc. In addition to the design and technical courses, the student is required to take four semesters of architectural history, of which two are selected from a number of options, several liberal and physical sciences, and a number of electives and professional electives. The latter may be chosen from among those offered by the school's faculty as well as from among selected courses offered by other departments. A list of professional electives is presented elsewhere in this section.

The general education requirements of the University apply generally to the architecture program, but architectural students are specifically required to complete math through MATH 220 and 221. Most students find it necessary to begin college math with MATH 115, followed by MATH 220 and 221. In addition, architecture students are required to complete Physics 121, Biology 101 and Computer Science 103.

LOCATION

The School is housed in a contemporary air-conditioned building on the campus about 10 miles from Washington, D.C., and about 50 minutes' drive from downtown Baltimore. This location, in the center of a large urban agglomeration and astride the eastern corridor, offers many opportunities for the School's program and the student's growth.

The School of Architecture building provides studio space, a library, exhibit space, a shop, a photo lab, classrooms and lecture hall facilities.

LIBRARY

The Architectural School Library at present comprises some 9,000 volumes. It is expected that the library will number 12,000 to 15,000 volumes by 1973. This will make it one of the major architectural school libraries in the nation. The library subscribes to about 100 foreign and domestic periodicals providing resources in urban sociology, building technology and urban planning as well as in architecture.

The visual aids library presently comprises about 45,000 35-mm. color slides in architecture. landscape architecture and urban planning.

ADMISSION

Because there is a fixed limit to the number of candidates who can be admitted each year, it is important that the following instructions be carefully followed:

1. *Students applying from high school:* write the Director of Admissions, University of Maryland, College Park, Md. 20742 for application instructions;
2. *Students who have completed work at other universities:* write the Director of Admissions, University of Maryland, College Park, Md. 20742 for application instructions;
3. *Students transferring from other colleges of the University of Maryland:* please pick up an application record form at the School of Architecture, and return it to the assistant dean of the School, together with a record of all work taken at the University of Maryland.

Deadlines: all application procedures should be completed and materials in hand at the University by March 1. Applications received after this date, but before the University deadline dates for new students and for transfer students, will be considered only on a space-available basis.

FINANCIAL ASSISTANCE

For promising young men and women who might not otherwise be able to attend the University's School of Architecture, a number of grants and scholarships are available, some earmarked specifically for architectural students. New students must apply before March 15. Students already enrolled may apply before May 1. All requests for information concerning these awards should be directed to: Director, Student Aid, University of Maryland, College Park, Md. 20742.

THE DIVISION OF HUMAN AND COMMUNITY RESOURCES

The Division of Human and Community Resources includes the faculties and programs of the College of Education, the College of Human Ecology, the College of Physical Education, Recreation and Health, and the School of Library and Information Services. The programs of the Division are essentially professional. They are designed to prepare teachers and school service personnel; professionals interested in the quality of life of the individual, groups and the community factors which influence the interaction of people; those who are responsible for community health, recreation programs and activities; technical, public and school librarians, and information scientists. In addition to emphasis on teaching and research the Division aspires to a broader contribution of its special knowledge and expertise to the University and Community at large. Specifically, the following Colleges and School and their respective departments are included in the Division:

COLLEGE OF EDUCATION

Department of Administration, Supervision and Curriculum
Department of Counseling and Personnel Services

Department of Early Childhood-Elementary Education
Department of Industrial Education
Department of Measurement and Statistics
Department of Secondary Education
Department of Special Education
Institute for Child Study

COLLEGE OF HUMAN ECOLOGY

Department of Family and Community Development
Department of Foods, Nutrition and Institution Administration
Department of Housing and Applied Design
Department of Textiles and Consumer Economics

COLLEGE OF PHYSICAL EDUCATION, RECREATION AND HEALTH

Department of Health Education
Department of Physical Education
Department of Recreation

SCHOOL OF LIBRARY AND INFORMATION SERVICES

The Division offers Bachelor's, Master's, and Doctorate degrees in most of its programs in addition to various professional certificates. The professional programs are accredited by the National Council for Accreditation of Teacher Education, the Maryland State Department of Education, the American Library Association Committee on Accreditation, and the American Home Economics Association. Unless otherwise stated the regulations and degree requirements of the present Colleges constituting the new Division shall remain in effect until revised policies of the Division are published.

COLLEGE OF EDUCATION

THE COLLEGE OF EDUCATION meets the needs of the following classes of students: (1) persons preparing to teach in colleges, secondary schools, elementary schools, kindergarten and nursery schools; (2) persons preparing to teach classes in special education or to be school librarians; (3) present or prospective teachers who wish to supplement their preparation; (4) students preparing for educational work in the trades and industries; (5) graduate students preparing for teaching, supervisory, advanced specialist or administrative positions; (6) certain students whose major interests are in other fields, but who desire courses in education.

Because of the location of the University in the suburbs of the Nation's Capital, unusual facilities for the study of education are available to its students and faculty. The Library of Congress, the library of the United States Office of Education, and special libraries of other government agencies are accessible, as well as the information services of the National Education Association, American Council on Education, United States Office of Education, and other organizations, public and private. The school systems of the District of Columbia, Baltimore and the counties of Maryland offer generous cooperation.

The teacher education programs preparing early childhood, elementary school and secondary schools teachers at the bachelor's degree and master's degree levels, and the programs preparing school service personnel (elementary and secondary school principals, general school administrators, supervisors, curriculum coordinators, guidance counselors, student personnel administrators, and vocational rehabilitation counselors) at the master's, advanced graduate specialist and doctoral degree levels are all fully accredited by the National Council for Accreditation of Teacher Education.

ORGANIZATION

The College is organized into seven departments, an institute and other non-departmental areas. These offer a wide range of curricula in teacher education or education specialties.

FACILITIES

The College is housed in two buildings. All departments and special areas with the exception of industrial education have their offices and instructional facilities in the College of Education Building. This building was planned with the special needs of teacher education in mind. The industrial education department is housed in the J. Milton Patterson Building. The facilities of this building are devoted exclusively to the work of that department.

GENERAL REQUIREMENTS FOR ADMISSION

In selecting students emphasis will be placed upon high marks and other indications of probable success in college rather than upon a fixed pattern of subject matter. Of the 16 required units, four units of English and one unit of social sciences, natural sciences and mathematics are recommended. Additional units in mathematics, natural sciences and social sciences are desirable for a program that permits the greatest amount of flexibility in meeting the requirements of various College of Education curricula. A foreign language is desirable for certain programs. Fine arts, trade and vocational subjects are acceptable as electives. Every prospective applicant should be certain that his preparation in mathematics is adequate for any program that he might wish to enter.

Candidates for admission whose high school or college records are consistently low are strongly advised not to seek admission to the College of Education.

Students with baccalaureate degrees who have applied for admission as special students must have received prior permission from the appropriate department.

GUIDANCE IN REGISTRATION

At the time of matriculation each student is tentatively assigned to a member of the faculty who acts as the student's advisor. The choice of subject areas within which the student will prepare to teach will be made under faculty guidance during the freshman year. The student will confer regularly with the faculty member in the College of Education responsible for his teaching major. While it may be possible to make satisfactory adjustments as late as the junior year for students from other colleges who have not already entered upon the sequence of professional courses, it is highly desirable that the student begin his curriculum work in the freshman year. *Students who intend to teach* (except agriculture and physical education) *should register in the College of Education,* in order that they may have the continuous counsel and guidance of the faculty directly responsible for teacher education at the University of Maryland.

GENERAL REQUIREMENTS OF THE COLLEGE

Minimum requirements for graduation are 124 semester hours including the four semester hours in required physical education and health. Specific program requirements for more than the minimum must be fulfilled. In cases where the physical education and/or health requirements are waived academic electives should be taken to insure the minimum of 124 hours.

In addition to the University General Education Program and the specific requirements for each curriculum, the college requires a minimum of 20 hours of education courses and three (3) hours of speech.

Marks in all required upper division courses in education and in subjects in major and minor fields must be C or higher, except in the case of student teaching where a grade of S is required. A general average of C or higher must be maintained. (See Admission to Teacher Education.)

Exceptions to curricular requirements and rules of the College of Education must be recommended by the student's advisor, department chairpersons, and approved by the dean.

Students who are not enrolled in the College of Education but who, through an established cooperative program with another college, are preparing to teach and wish to register in professional education courses required for certification must meet all curricular and scholastic requirements of the College of Education.

ADMISSION TO TEACHER EDUCATION

All students, full or part-time, who are in a teacher education curriculum, must apply to the Admission to Teacher Education Committee for admission to teacher education at the beginning of the semester immediately after earning 42 hours, excluding required physical education. Transfer students with 42 or more hours of acceptable transfer credit must apply at time of transfer. Transfer students must complete a minimum of 12 hours at Maryland before they can be admitted to Teacher Education. Post-graduate certification students and those working for certification only must apply at the beginning of their program. Application forms may be obtained from the College of Education Records Office, advisors or departmental offices.

In considering applications, the following guidelines have been established by the committee:

1. No student will be allowed to enroll in EDUC 300 and methods classes until he has received full approval.
2. Full approval is always granted with the understanding that the student will have a successful field experience in EDUC 300 and that any case may be reconsidered by the committee if subsequent academic performance declines.
3. Secondary education applicants must show evidence of ability to achieve on an above average level in courses directly related to their major field.
4. Applicants must be of good moral and ethical character. This will be determined as fairly as possible from such evidence as advisors' recommendations and records of serious campus delinquencies.
5. Applicants must be physically and emotionally capable of functioning as teachers. This will mean freedom from serious chronic illness, emotional instability and communicable disease, as determined in cooperation with the Health Service and the Counseling Center.
6. Applicants must be free of serious speech handicaps.

The purpose of the screening procedure associated with admission to teacher education is to insure that graduates of the teacher education program will be well prepared for teaching and can be recommended for certification with confidence.

MAJORS AND MINORS

In the Early Childhood-Elementary curriculum, no major or minor is required, but students must complete at least 80 hours of academic content work which includes an area of concentration of at least 18 hours.

In secondary education, majors only are required (except in speech education), although minors may be developed in most programs if students desire them. Specific programs should be consulted for information concerning minors.

STUDENT TEACHING

In order to be admitted to a course in student teaching, a student must have been admitted to

the Teacher Education Program (see above), and have a grade point average of 2.30 based on University of Maryland courses only, a physician's certificate indicating that the applicant is free of communicable diseases and the consent of the instructor in the appropriate area. Application must be made with the Coordinator of Laboratory Experiences by the middle of the semester which precedes the one in which student teaching will be done. Any applicant for student teaching must have been enrolled previously at the University of Maryland for at least one semester.

CERTIFICATION OF TEACHERS

The State Department of Education certifies to teach in the approved public schools of the state only graduates of approved colleges who have satisfactorily fulfilled subject-matter and professional requirements. The curricula of the College of Education fulfill State Department requirements for certification.

DEGREES

The degrees conferred upon students who have met the conditions prescribed for a degree in the College of Education are Bachelor of Arts and Bachelor of Science. Majors in English, languages, library science, and social sciences receive the B.A. degree. Art, mathematics and speech majors may receive either degree. All others receive the B.S. degree.

COURSE OFFERINGS NON-DEPARTMENTAL AREAS

Non-departmental areas offer curricula which prepare students for certification and offer service for graduate majors. Included are school librarianship; history, philosophy and sociology of education and comparative education (social foundations of education); and some aspects of adult education.

SPECIAL SERVICES

The college provides several kinds of special services for faculty, students, schools, and teachers in the field:

BUREAU OF EDUCATIONAL RESEARCH AND FIELD SERVICES

The Bureau of Educational Research and Field Services has been established to (1) encourage and stimulate basic research bearing on different aspects of the educative process; (2) provide assistance in designing, implementing and evaluaitng research projects initiated by local school systems; (3) coordinate school systems' requests for consultants with the rich and varied professional competencies that are available on the University faculty.

CURRICULUM LABORATORY

The Curriculum Laboratory provides students, faculty and teachers in the field with materials and assistance in the area of curriculum. An up-to-date collection of curriculum materials is maintained. This includes texts, courses of study, study guides, curriculum studies and bibliographies. The laboratory is equipped to assist students and student teachers with preparation of teaching plans.

EDUCATIONAL TECHNOLOGY CENTER

The center is designed as a service facility for faculty and students that provides teaching aids of all kinds, audio-visual equipment and service, instruction in all aspects of instructional materials, aids, and new media. This 12-room complex contains model, flexible-in-size classrooms for optimal use of instructional media, an independent learning laboratory with 40 student stations, production and distribution rooms for a closed-circuit television and video tape system, laboratories for graphic and photographic production, and space for faculty research and development in the use of instructional media. Supporting the professional faculty in the operation of the center are such media specialists as a graphic artist and a television technician.

While the Educational Technology Center will function as a demonstration facility for on and off-campus groups requiring model media facilities, it is also designed to serve an instructional program offering graduate degrees in educational technology.

OFFICE OF LABORATORY EXPERIENCES

The Office of Laboratory Experiences is designed to arrange off-campus placement in laboratory experiences for students preparing to teach. In this capacity, it serves as a liaison between the University and the public schools. Applications for field placements, EDUC 300 students and student teachers are processed through this office. This office is also responsible for the Teacher Education Centers.

MUSIC EDUCATORS NATIONAL CONFERENCE HISTORICAL CENTER

The University of Maryland and the Music Educators National Conference established the MENC Histroical Center in 1965 for the purpose of building and maintaining a research collection which would reflect the development and current practices in music education. Located in McKeldin Library, the center includes study space and is prepared to assist scholars in the field. Materials in the following categories are collected: archival documents of the MENC; instructional materials; professional publications; curricular, administrative, and philosophical materials; manuscripts, personal letters and other historical materials.

UNIVERSITY CENTER FOR YOUNG CHILDREN

Housed in the College of Education, the Nursery-Kindergarten Laboratory School services the total University in the following ways: (1) acts as a center in which individual professors or students may conduct research; (2) serves as a unit for undergraduate students to have selected experiences with young children, such as student teaching, child study, and other forms of participation in a program for young children; (3) provides a setting in which educators from within and without the University can come for sources of ideas relative to the education of young children.

READING CENTER

The Reading Center provides clinical diagnostic and corrective services to a limited number of children. These services are a part of the program in correction and remedial reading offered to teachers on the graduate level.

SCIENCE TEACHING CENTER

The Science Teaching Center has been designed to serve as a representive facility of its type to fulfill its functions of undergraduate and graduate science teacher education, science supervisor training, basic research in science education, aid to inservice teachers and supervisors, and consultative services, on all levels, kindergarten through community college. Its reference library features relevant periodicals, science and mathematics textbooks, new curriculum materials, and works on science subjects and their operational aspects. Its fully equipped research laboratory, in addition to its teaching laboratories for science methods courses, provides project space for both faculty and students.

Since 1962 the Science Teaching Center has served as the headquarters for the activities of the Science Teaching Materials Review Committee of the National Science Teachers Association. The Information Clearinghouse on Science and Mathematics Curricular Developments, started here that year also, is now the International Clearinghouse for A.A.A.S., N.S.F. and UNESCO. Within the center, then, is gathered the "software" and "hardware" of science education in what is considered to be one of the most comprehensive collections of such materials in the world.

STUDENT AND PROFESSIONAL ORGANIZATIONS

The college sponsors a chapter of the Student National Education Association, which is open to undergraduate students on the College Park campus. A student chapter of the Council for Exceptional Children is open to undergraduate and graduate students interested in working with exceptional children. A student chapter of the Music Educators National Conference (MENC) is sponsored by the Department of Music, and the Industrial Education Department has a chapter of the American Society of Tool and Manufacturing Engineers and a chapter of the American Industrial Arts Association.

In several departments there are informal organizations of students. All policy-recommending committees of the college include student representation.

CAREER DEVELOPMENT CENTER
UNIVERSITY CREDENTIALS SERVICE

All seniors graduating in the College of Education (except Education for Industry majors) are required to file credentials with the Placement Office in Cumberland Hall basement. Credentials consist of the permanent record of a student's academic preparation and recommendations from academic and professional sources. An initial registration fee enables the Placement Office to send a student's credentials to interested educational employers, as indicated by the student.

Students who are completing teacher certification requirements, who are completing advanced degrees and are interested in a teaching, administrative or research position in education, or who are completing advanced degrees in library science may also file credentials.

Other services include vacancy listing in secondary schools and institutions of higher learning, notifications of interest-related position, on-campus interviews with state and out-of-state school systems, and descriptive information on school systems throughout the country.

This service is also available to alumni. For further information contact Mrs. Anna Tackett, Assistant Director of Placement, the placement office, Cumberland Hall basement; or phone 454-2813.

OFF-CAMPUS COURSES

Through the University College, a number of courses in education are offered in Baltimore, in other centers in Maryland and overseas. These courses are chosen to meet the needs of groups of students in various centers. In these centers, on a part-time basis, a student may complete a part of the work required for an undergraduate or a graduate degree. Announcements of such courses may be obtained by addressing requests to the Dean, University College, College Park, Maryland.

COLLEGE OF HUMAN ECOLOGY

THE COLLEGE OF HUMAN ECOLOGY reflects the progress and growth made by Home Economics in recent years in directing its focus toward the needs of individuals and society. We share in the obligation of all higher education to provide a broad based education for every individual as preparation for living in close harmony with our environment in both the immediate and long-range future.

Human Ecology is an applied field of study, in-

terdisciplinary in nature, which studies the individual and/or living unit* and the interactive nature of those factors in communities which impinge upon them. It draws upon the basic disciplines of the natural, social, and behavioral sciences and the arts for application and utilization. The curricula afford the opportunity for improving the quality of life in man's near environment.

The College seeks to provide the proper balance of educational experiences which prepare an individual in the professional context as well as those experiences which benefit him personally as a fully functioning and contributing member of society. This includes grounding in basic and applied skills, as well as providing an atmosphere where creativity may flourish to enhance our potential for developing innovative solutions to human societal problems of living.

The faculty utilizes existing knowledge and generates new knowledge, techniques and methods based on research, while providing opportunities through laboratory, practical and field experiences for making knowledge and innovative discovery more meaningful to the individual. Through these experiences the faculty experiments with varying relevant techniques and methods by which the individual can transfer to the society at large new ideas and techniques for more effective interaction within the social and physical ecosystems in which we function.

Through teaching, research, and service the College provides appropriate, comprehensive, quality education programs that prepare students for professional positions directed toward the improvement of conditions contributing to

1. The individual's psycho-social development.
2. The quality and availability of community resources which enrich family life (in all its various forms).
3. Effective resource utilization including consumer competence.
4. The individual's physiological health and development.
5. The physical and aesthetic components of man's near environment.
6. Effective use of leisure time.

In accordance with the philosophy of this College all four departments are interrelated and cooperate in the achievement of these goals. The activities of the Department of Family and Community Development emphasize goals 1 through 3; the Department of Food, Nutrition and Institution Administration, 2 through 4; and with different foci and priorities, the activities of the Departments of Textiles and Consumer Economics, and Housing and Applied Design emphasize goals 2, 3 and 5. Goal 3 requires consumer competence in food, clothing, shelter, transportation, insurance, medical, recreation, etc., and is an integrative, interdisciplinary, educational concept which necessitates major input from all four departments. Goal 6 is becoming increasingly important with a reduced work week and increases in our over-65 population, and also suggests interdepartmental and interdisciplinary programs.

*Individual, family, other

Objectives

1. Offer appropriate, comprehensive bachelor, master and doctoral programs that address the six goals stated above.
2. Maximize resources and resource utilization in order to accomplish the six goals stated above.
3. Act as a resource to the university community to stimulate awareness and interest in the problems of applying knowledge for improving the quality of life.

SPECIAL FACILITIES AND ACTIVITIES

PHYSICAL FACILITIES

The College of Human Ecology building follows the campus tradition in style, and a construction program has been initiated to provide expanded facilities. A management center is maintained on the campus for resident experiences in management activities of family life.

Located between two large cities, the college provides unusual opportunities for both faculty and students. In addition to the University's general and specialized libraries, Baltimore and Washington furnish added library facilities. The art galleries and museums, the government bureaus and city institutions stimulate study and provide enriching experiences for students.

STUDENT ORGANIZATIONS

AATT—STUDENT CHAPTER

The Student Chapter of the American Association for Textile Technology provides students with and early opportunity to become associated with the professional organization of AATT, and to advance at the local level the aims and goals of the parent National Association.

Through speakers from the textiles and apparel industry, members are kept abreast of the latest techniques and ideas in textiles, as well as coming in contact with prospective future employers.

The chapter hopes to establish several intern programs to provide its members with an opportunity to gain some vocational experience before graduation.

All undergraduate students, including freshmen, are eligible to join AATT if their curriculum includes at least one major course in the field of textiles.

A.I.D.—Student Chapter

The University of Maryland Student Chapter of the American Institute of Interior Designers is sponsored by the professional chapter of A.I.D.,

Washington, D.C. Interior Design majors from the sophomore class upwards may become members. Contacts and exchanges with professionals and fellow students at meetings sponsored by both groups orient the students to the job market and keep them informed of new directions in the profession. The A.I.D. professional chapter sponsors "A Day with a Designer" and assists in locating summer jobs for upperclass interior design majors.

COLLEGIATE HOME ECONOMICS ORGANIZATION

The University of Maryland Collegiate Home Economics Organization is the student affiliate of the American Home Economics Association and the Maryland Home Economics Association. Welcoming any Human Ecology major into its membership, the organization meets once a month, and links the professional world to the college student through different programs.

The Collegiate Home Economics Organization is the student's opportunity to join a professional group prior to graduation and to participate on a student level in the national association.

Each speaker or demonstrator provides the Collegiate Home Economics Organization member with ideas and suggestions for their own professional preparation by introducing the member to the many facets of Human Ecology.

The Organization gives both students and faculty a chance to work together and meet on an informal basis and to open up better channels of communication among themselves as well as the outside professional world.

N.S.I.D.—Student Chapter

The student chapter of the National Society of Interior Designers promotes interchange of ideas between students and professionals through jointly sponsored meetings. Student members are kept advised by the national office of N.S.I.D. as to developments within the organization and a national job referral service is provided for design graduates.

OMICRON NU

A national honor society whose objectives are to recognize superior scholarship, to promote leadership and to stimulate an appreciation for graduate study and research in the field of home economics and related areas. Graduate students, seniors and second semester juniors are eligible for election to membership.

STUDENT SENATE

This elected, advisory group of students promotes the interests of the College of Human Ecology. Student representatives to the College Assembly, College Council and Standing Committees of the College Assembly are named from this group.

FINANCIAL AID

A LOAN FUND, composed of contributions by the District of Columbia Home Economics Association, Maryland Chapter of Omicron Nu, and personal gifts, is available through the University Office of Student Aid.

ADMISSION

All students desiring to enroll in the College of Human Ecology must apply to the director of admissions of the University of Maryland at College Park.

DEGREES

The degree of Bachelor of Science is conferred for the satisfactory completion, with an average of C or better, of a prescribed curriculum of 120 academic semester hour credits. This is exclusive of health and physical activities for women and men. No grade below C is acceptable in the departmental courses which are required for a departmental major.

STUDENT LOAD

The student load in the College of Human Ecology varies from 15-19 credits. A student wishing to carry more than 19 credits must have a "B" grade average and permission of the dean.

A minimum of 120 academic credits is required for graduation. However, for certification in some professional organizations additional credits are required. Consult your advisor.

GENERAL INFORMATION

Specific inquiries concerning undergraduate or graduate programs in the College of Human Ecology may be directed to the chairmen of the various departments or the Dean, College of Human Ecology, University of Maryland, College Park, Maryland 20742.

CURRICULA

A student may elect one of the following curricula, or a combination of curricula: food, nutrition, dietetics, or institution administration (food service); family, community, or management and consumer studies; home economics education; housing, advertising design, interior design, design, or crafts; textile science, textile marketing, textiles and apparel or consumer economics. A student who wishes to teach home economics may register in home economics education in the College of Human Ecology under the Department of Family and Community Development or in the College of Education.

REQUIRED COURSES

The curricula leading to a major in the College of Human Ecology are organized into four broad professional categories: (1) technical areas, (2) educational, community and family life areas, (3)

consumer service areas, and (4) design areas. These represent the broad professional fields into which graduates are eligible to enter and pursue their chosen work. The positions vary in nature, scope and title, but require similar general studies background and fundamentals for specialization.

Individual programs of study are developed cooperatively with faculty advisors to provide a balanced and sequential arrangement of studies in preparation for the chosen field. University, college, and departmental requirements are identified for curricula in each of the departments.

All students in the College of Human Ecology are required to complete a series or sequence of courses to satisfy University, college and departmental requirements. The remaining courses needed to complete a program of study are elected by the student with the approval of his advisor.

The final responsibility of meeting all the requirements for a specific major *rests with EACH individual student.*

UNIVERSITY REQUIREMENTS

(General Education—Academic)

	Semester Credit Hours
ENGL REQUIREMENT or ENGL HONORS COMP 171	3
ENGL REQUIREMENT	6
Fine Arts or Philosophy (choice of one)	3
DANC 200, 482 or 483, 484 ARTH 100, 260, 261, 284, 320, 321, 330, 331; 340; 341 MUSC 130 DART 110, 170 PHIL 100, 170, 140, 233, 236, 250, 330, 457; 444	
History (any combination of History courses for which the student is eligible except State History)	6
Mathematics (any credit bearing course) SAT score determines qualification	3-4
Natural Science (choice of two courses) If the science requirements are not specified in departmental majors, one course must be a physical science and the other a biological science. One of them must be a laboratory (four hour) course.	7
Social Science (choice of two courses) SOCY 100, ANTH 101, ECON 205 or 201, GVPT 170, GVPT 100 or 300, PSYC 100, GEOG 100, GNED 260, RATV 124	6
Total	34-35

(Non-Academic)

For men and women:	
HLTH 105	(2)
Physical Education—two semesters	(2)
Total	(4)

COLLEGE OF HUMAN ECOLOGY REQUIREMENTS

(For every student depending on the Major)	
APDS 101—Fundamentals of Design OR Human Ecology Elective*	3
TEXT 105—Textiles in Contemporary Living OR Human Ecology Elective*	3
FOOD 110—Food and Nutrition of Individuals and Families or NUTR 100—Elements of Nutrition OR Human Ecology Elective*	3
FMCD 250—Decision Making in Family Living OR Human Ecology Elective*	3

*Human Ecology Elective to be taken in departments other than Major Department.

Root Discipline Requirements Outside the College

SOCY 100—Sociology of American Life [1]	3
PSYC 100—Introduction to Psychology [1]	3
ECON 205—Fundamentals of Economics [1]	3
SPCH 107 or 100—Public Speaking	2-3

Typical Freshman Year (15 to 18 hours each semester)*

	Semester Hours
ENGL Requirement	6
Mathematics	0-3
FMCD 105—Introduction to Family Living or Human Ecology Elective*	3
APDS 101—Fundamentals of Design or Human Ecology Elective*	3
SPCH 107 or 100—Public Speaking	2-3
SOCY 100—Sociology of American Life	3
FOOD 110—Food and Nutrition of Individuals and Families or Human Ecology Elective*	3
TEXT 105—Textiles and Clothing in Contemporary Living or Human Ecology Elective*	3
Physical or Biological Science	3-6
HLTH 105	(2)
Physical Education	(2)
Electives	4

COLLEGE OF PHYSICAL EDUCATION

THE COLLEGE OF PHYSICAL EDUCATION, RECREATION AND HEALTH provides preparation leading to the Bachelor of Science degree in the following professional areas: physical education, health education and recreation. The college also offers curricula in safety education and elementary physical education. The college provides a research laboratory for faculty members and students who are interested in investigating the effects of exercise and various physical education activities upon the body, as well as determining methods and techniques of teaching various sports.

A one year required program of physical education and a one semester required health education program are provided by this college for all freshmen men and women of the University. The college provides an extensive intramural sports program for both men and women.

In addition to its various on-campus offerings, this college regularly conducts courses in physical education, health education and recreation in various parts of the State of Maryland and conducts workshops wherever requested by proper officials.

FACILITIES

Five separate buildings are used for the Intramural Sports Program for men, the WRA Program for women, the Professional Physical Education

*Human Ecology Elective to be taken in departments other than Major Department.

[1]Any two of these automatically satisfy the six-hour social science requirement of General Education.

Program, the Health Education Program, and the Recreation Program.

INDOOR ACTIVITIES

STUDENT ACTIVITIES BUILDING. This building houses the offices of the Department of Intercollegiate Athletics and the College of Physical Education, Recreation and Health. It contains six activity teaching stations: the main arena, the swimming pool, the small gym, the weight training room, the wrestling room, and the judo room. In addition, there are ten classrooms, a research laboratory, a safety and driver education center, and a conference room.

The main arena of this building has 19,796 sq. ft. of floor space. This arena provide facilities for class work in basketball, volleyball, badminton, and fencing.

The swimming pool is divided into two areas by a permanent bulkhead. The shallow end is 42 x 24 feet and the large area is 42 x 75 feet with a depth ranging from 4 to 13 feet.

The small gymnasium is used for gymnastics, including tumbling, trampolining and all types of apparatus work. The total floor space is 9,462 sq. ft.

The weight training classroom is equipped with sufficient weights for 11 stations of three men each.

There is a wrestling room containing 8,056 sq. ft.

PREINKERT FIELD HOUSE. Preinkert Field House contains offices for faculty in physical education and health education. There is a regulation size swimming pool, 75 x 35 feet, equipped with two one-meter diving boards. In the gymnasium, 90 x 50 feet, classes are held in badminton, volleyball, and basketball. An adjacent classroom is used for professional classes. The dance studio, used for dance and fundamental of movement classes, is 40 x 60 feet.

In addition to the above areas, there are locker and shower rooms used by women enrolled in physical education and those participating in recreational activities and a small lounge for major students.

ARMORY. The Armory is used primarily for the intramural program. It houses the offices of the director of intramurals and an athletic equipment room from which students may secure equipment for recreational purposes. The 28,800 sq. ft. of floor space has four basketball courts, with badminton and volleyball courts superimposed on them. This facility is also used as an indoor track, with an indoor vaulting, high and broad jump pits, a one-tenth mile track, and a 70 yard straightaway.

COLISEUM. The Coliseum is used as a supplementary facility for intramurals and physical education classes for men and women. Included in the facilities are an equipment issue room, shower and locker rooms for both men and women, a classroom, an adapted physical education laboratry, and office space for several of the men's and women's physical education staff.

The 6,555 square feet of floor space is used primarily for co-educational classes in square and social dance and for intramural basketball court, however, there are five badminton and two volleyball courts available for co-ed class instruction.

NEW PHYSICAL EDUCATION BUILDING

The first phase of a projected three-phase, multi-million dollar facility is near completion on the North campus near the Cambridge dorm complex. This initial building will have two regulation basketball courts, ten badminton courts, three volleyball courts, eight handball courts, men and women locker rooms and the first portion of the research laboratory. It will include some 40,000 square feet and will cost approximately 1.5 million dollars. There are near this building eight lighted tennis courts.

HEALTH EDUCATION DEPARTMENT EAST EDUCATION ANNEX

This building provides offices for faculty and graduate assistants of the Department of Health Education.

OUTDOOR ACTIVITIES

THE STADIUM. The stadium, with a seating capacity of 33,536 has a one-quarter mile cinder track with a 220-yard straightaway. Pits are availble for pole vaulting and high and broad jumping. Immediately east of the stadium are facilities for the shot put, discus and javelin throw. The College of Physical Education, Recreation and Health uses these facilities for classes in track and field. Also east of the stadium are three practice football fields, the baseball stadium, and a practice baseball, lacrosse, and soccer field. The College uses some of these facilities for major skill classes in football, soccer, and baseball. West of the stadium are four combination soccer-touch football play fields, complete with goal posts, and four softball fields with wire backstops for physical education classes and recreational use.

Surrounding the Armory are four touch football fields and eight softball fields, encompassing 18.4 acres. These fields, and the four in the Fraternity Row are used for intramurals.

Immediately west of the Cole Activities Building are 14 all-weather tennis courts. A modern 18-hole golf course was opened in 1957. This 204-acre course includes two lakes, and an additional 5.8-acre golf driving range for instructional purposes. The golf driving range, equipped with lights, and the golf course greatly adds to our present recreational facilities. An outdoor playing field 300 feet by 600 feet is also provided for touch football, soccer, speedball and softball.

The outdoor facilities adjacent to the Preinkert Field House include four hard-surfaced tennis courts, and a combination hockey and lacrosse field.

RESEARCH LABORATORY

One of the important aspects of advanced study at the University of Maryland is research. To encourage research, the College of Physical Education, Recreation and Health makes available to the student a well-equipped research laboratory. Students and faculty alike are encouraged to make use of the laboratory and its facilities for the purpose of conducting their special research projects.

GENERAL INFORMATION
ENTRANCE REQUIREMENTS

All students desiring to enroll in the College of Physical Education, Recreation and Health must apply to the director of admissions of the University of Maryland at College Park.

Sixteen units of high school credits are required for admittance to this college. *Required* high school subjects are: four units of English, one unit of social science and one unit of natural science. *Desirable* high school subjects include: algebra, plane geometry and additional natural and physical sciences, such as chemistry and physics.

Satisfactory health and physical vigor are essential for persons pursuing a career in the areas of this college.

GUIDANCE

At the time of matriculation and first registration, each student is assigned to a member of the faculty of the college who acts as the student's academic advisor. This faculty member will be in physical education, recreation or health education, depending on the student's choice of curriculum. The student should confer regularly with his advisor prior to each registration.

NORMAL LOAD

The normal university load for students is 12-21 credit hours per semester. The requirements in physical education and health for men and women are fulfilled by professional courses in the college. No student may register for more than 19 hours unless he has a "B" average for the preceding semester and approval of the dean of the college.

ELECTIVES

Electives should be planned carefully, and well in advance, preferably during the orientation course the first semester, or with the student's academic advisor during the second semester. It is important to begin certain sequences as soon as possible to prevent later conflict. Electives may be selected from any department of the University in accordance with a student's professional needs. Those selected must meet with the approval of the advisor and the dean of the college.

TRANSFER STUDENTS

Only students in good standing as to scholarship and conduct are eligible to transfer into this college from another college or university. Only courses applicable to his curriculum and passed with a grade of C or better will be transferred. Students wishing to transfer to this college from another college of this University are subject to the general University regulations on this subject.

FRESHMAN AND SOPHOMORE PROGRAM

The work of the first two years in this college is designed to accomplish the following purposes: (1) provide a general basic or core education and prepare for later specialization by giving a foundation in certain basic sciences; (2) develop competency in those basic techniques necessary for successful participation in the professional courses of the last two years.

While much of the academic course work will be alike, the technique courses will vary considerably in the different curriculums. The technique courses must be satisfactorily completed, or competencies demonstrated before the student can be accepted for the advanced courses in methods and in student teaching. It is very important that each requirement be met as it occurs.

STUDENT TEACHING

Opportunity is provided for student teaching experience in physical education and health education. The student devotes eight weeks during the last semester of his senior year to observation, participation, and teaching under a qualified supervising teacher in an approved elementary, junior or senior high school or in a combined program at the elementary and secondary levels. A University supervisor from the College of Physical Education, Recreation and Health visits the student periodically and confers with both the student teacher and the cooperating teacher, giving assistance when needed.

To be eligible for student teaching, the student must (1) *have the recommendation of the University supervising teacher,* and (2) *must have fulfilled all required courses for the B.S. degree except those in the Block Student Teaching Semester except for those exceptions approved by each department.* The student must obtain a grade of C or better in all professional courses in his curriculum and he must register for all courses in the "Block" concurrently. Those desiring to teach at the elementary level must have successfully completed PHED 420 and must split their teaching experience into 4 hours of EDSE 374 and 4 hours of

EDEL 336. Those desiring an elementary minor in physical education must also complete PHED 155, 157 and 495.

FIELD WORK

Recreation major students are expected to carry out a number of field experiences during their University career; volunteer or part-time recreation employment during the school year, summer employment in camps or at playgrounds, etc. These experiences culminate in a senior semester of field work for which a student receives credit and during which the student works as a staff member (for 20 hours per week) in the field of recreation in which he or she hopes to be employed, such as public recreation, recreation for the exceptional, agencies (Y's, Scouts, etc.), military recreation, etc.

DEGREES

The degree of Bachelor of Science is conferred upon students who have met the conditions of their curricula as herein prescribed by the College of Physical Education, Recreation and Health.

Each candidate for a degree must file a formal application with the Registrations Office during the registration period, or not later than the end of the third week of classes of the regular semester, or at the end of the second week of the summer session, prior to the date of graduation.

CERTIFICATION

The Maryland State Department of Education certifies for teaching only when an applicant has a tentative appointment to teach in a Maryland county school. No certificate may be secured by application of the student on graduation. Course content requirements for certification are indicated with each curriculum. Certification is specifically limited to graduates who "rank academically in the upper four-fifths of the class and who make a grade of C or better in student teaching." In order to insure the meeting of these requirements, students will not be approved for student teaching except as indicated above. A student intending to qualify as a teacher in Baltimore, Washington or other specific situations should secure a statement of certification requirements before starting work in the junior year and discuss them with his academic advisor.

STUDENT ORGANIZATIONS

MAJORS' CLUB: All students enrolled in the college are eligible for membership in this organization. It conducts various professional meetings, brings in speakers and promotes various corecreational activities. It has sponsored trips to district and national conventions of the American Association for Health, Physical Education and Recreation, and is chartered as a student major club of that organization.

AQUALINERS: This synchronized swimming club is open to all men and women registered in the University. Through weekly meetings the group concentrates on additional stroke perfection, individual and group stunts, diving, and experimentation with various types of accompaniment and choreographic techniques. An original water show is presented each spring and several demonstrations are given each year. Tryouts are held twice a year—once at the beginning of the fall semester, and again after the water show during the spring semester.

UNIVERSITY OF MARYLAND RECREATION AND PARKS SOCIETY: In the fall of 1959 the University of Maryland Recreation and Parks Society was formed by the undergraduate and graduate major and minor students of the college. The society, an affiliate of the state and national recreation organizations, provides opportunities for university and community service, for rich practical experience, and for social experiences for those students having a mutual professional recreation interest.

GYMKANA TROUPES: The Gymkana Troupe includes men and women students from all colleges who wish to express themselves through the medium of gymnastics. These individuals coordinate their talents in order to produce an exhibitional performance that has been seen in many places including Bermuda, Iceland, the Azores, Idaho, Montana, and the eastern seaboard of the United States. The organization has three principal objectives: (1) to provide healthful, co-recreational activities that provide fun for the students during their leisure hours; (2) to promote gymnastics in this locality; and (3) to entertain our students and people in other communities.

This organization is co-sponsored by the Physical Education Department and the Student Government Association, and it welcomes any student, regardless of the amount of experience, to join.

INTRAMURALS FOR MEN: The Intramural Department offers an extensive opportunity for all men to participate in a recreational program of either individual or team sports. A variety of activities are available to fill the student's leisure time and develop skills which may be carried over into later life. Also, many desirable attributes, such as fair play, leadership, teamwork, and sportsmanship, are encouraged and developed by the student participating in the program.

Leagues and tournaments are conducted in the following sports: touch football, horseshoe pitching, tennis, cross country, track and field, basketball, table tennis, badminton, boxing, wrestling,

bowling, volleyball, swimming, foul shooting, and softball.

Management and officiating in intramural sports are conducted by students majoring in physical education under the supervision of the director of intramurals and under policies and regulations established by the Intramural Council.

WEIGHT LIFTING CLUB: The University of Maryland Weight Lifting Club is open to all students and faculty for exercise with the weights throughout the week during all hours that Cole Student Activities Building is open.

The University of Maryland Olympic Barbell Club is a more highly organized group of the original club. It is recognized by the Student Government Association. Bi-monthly meetings are held which assist in leadership, offer clinics and demonstrations, etc.; participate in competition, and earn awards of recognition.

WOMEN'S RECREATION ASSOCIATION: *All women students of the University are members of the Women's Recreation Association,* an affiliate of the Athletic and Recreational Federation of College Women. Under the leadership of its elected student officers and representatives and appointed sports managers, the WRA sponsors a program of intramural, extramural and interest group activities. These activities seek to develop new interests and skills for leisure-time enjoyment, provide opportunities for continuing both old and new interests, and provide a democratic atmosphere for educational leadership experiences. Included are free and tournament play in archery, badminton, basketball, bowling, fencing, field hockey, golf, softball, swimming, table tennis, and volleyball; social events; and co-recreational activities in bowling, badminton, and volleyball. Intramural tournaments are organized through the dormitory, sorority, and "day dodger" groups of the University. Sports Days and Play Days with other colleges and universities enable the more skilled students to participate with others of similar abilities. Opportunities are also provided for officiating experience and for the earning of official WNORC ratings in basketball, field hockey, swimming, and volleyball.

Various special groups and clubs interested in recreation exist on Campus outside the Women's Recreation Association program and offer rich opportunities for the development of their recreational interest. Some of these are the Terrapin Trail Club, Chess Club, Sailing Club, Ski Club, and musical and dramatic groups.

PHI ALPHA EPSILON: Honorary Society of the College of Physical Education, Recreation and Health.

The purpose of this organization is to recognize academic achievement and to promote professional growth by sponsoring activities in the fields of physical education, recreation, health and related areas.

Students shall qualify for membership at such time as they shall have attained junior standing in physical education, health or recreation, and have a minimum overall average of 2.7 and a minimum professional average of 3.1. Graduate students are invited to join after 10 hours of work with a 3.3 average. The organization is open to both men and women.

SIGMA TAU EPSILON: This society, founded in 1940, selects those girls who have attained an overall 2.5 average and demonstrated outstanding leadership, service and sportsmanship like qualities in the organization and activities of the Women's Recreation Association and its affiliated groups.

ETA SIGMA GAMMA: Epsilon chapter was established at the University of Maryland in May of 1969. This professional honorary organization for health educators was established to promote scholarship and community service for health majors at both the graduate and undergraduate levels. Students may apply after two consecutive semesters with a 2.75 cumulative average.

SCHOOL OF LIBRARY AND INFORMATION SERVICES

The School of Library and Information Services is a graduate program which draws its students from many undergraduate disciplines. Although many of the School of Library and Information Services students have degrees in the social sciences and humanities, there is an increasing interest in people with diverse backgrounds—in the sciences, for example. The continued influence of scientific advances, the variations in clientele and service patterns, and the constantly shifting character of the societal scene are among the factors which have signficantly influenced and will doubtless influence all the more in the future the scope and character of library functions and responsibilities. The library and information professional in the 1970's must have competence in many disciplines if he is to serve well in the information centers, urban areas, public libraries, and school libraries. The School of Library and Information Services is a visionary school, attempting to produce people to fill contemporary needs.

The undergraduate program was established for the purpose of preparing school librarians at the initial certification level, but the program is in a transitional state. In the library field there is currently an emphasis on diversified staffing patterns and career ladder opportunities, because of the need for persons with varying levels of skills to work in diversified library environments. There is an attempt to broaden the undergraduate program to fulfill these needs. The revised program will pro-

vide opportunities for students in undergraduate disciplines other than education to enroll in undergraduate courses in librarianship. The goal of this revised program will be to combine broad undergraduate subject matter competence with courses in librarianship with the intent of producing personnel to fill special roles in the library field where special needs are increasing, such as in federal libraries, public libraries, and information centers. While the undergraduate program fulfills a great need in training school library personnel and persons to fill special roles, the master's degree program in the School of Library and Information Services is the recognized avenue for preparing fully qualified professionals in the library field.

For information regarding the undergraduate library science education program, refer to the Index Listing for: **"Departments, Programs and Curricula Library Science Education Curriculum."**

PROFESSIONAL SCHOOLS

DENTAL HYGIENE

The primary responsibility of the dental hygiene profession is to promote optimal oral health through the provision of preventive and educational services complementary to those within the purview of the dental profession.

In clinical office practice the dental hygienist's services are provided under the supervision of a dentist and are defined and governed by state dental practice acts. Although minor differences exist between state laws, in general those services which constitute permissible dental hygiene practice include: obtaining the patient's medical and dental history; conducting a preliminary clinical oral examination of the teeth and surrounding tissues for diagnosis by the dentist; performing diagnostic procedures (x-rays, impressions for study casts, saliva tests, oral cytologic smears, etc.) for use by the dentist; providing a complete oral prophylaxis (removal of all hard and soft deposits and stains and polishing of natural and restored surfaces of the teeth); applying topical medicaments and preventive agents; and assisting with office duties as assigned by the dentist. The dental hygienist also assumes a major role in patient education and counseling and supervision of oral hygiene practices.

Although the majority of dental hygienists are employed in dental offices, there are numerous opportunities and a growing need for those with baccalaureate and graduate degrees in dental hygiene education, community or public health, private and public institutions, commissioned service in the Armed Forces, research, and other special areas of practice. The dental hygienist's activities in these areas are dependent in varying degrees upon dental knowledge and skills in providing clinical services. However, additional study beyond the basic dental hygiene curriculum is essential preparation for advanced professional career opportunities.

PROGRAM DESCRIPTION

Dental hygiene offers only a four-year baccalaureate degree program. The curriculum includes two years of preprofessional courses, a third year of intensive dental and dental hygiene study with clinical application and a fourth year of advanced clinical practice and upper division electives in a recommended area of study, which will constitute a minor related to a specialized area of dental hygiene practice. The first two years of the preprofessional curriculum include humanities and social science requirements of the University of Maryland, dental hygiene education accreditation requirements and elective lower division courses. Completion of the preprofessional curriculum at the University of Maryland or another campus will be required for eligibility to apply for enrollment in dental hygiene as a junior.

ADMISSIONS AND APPLICATIONS PROCEDURES

HIGH SCHOOL STUDENTS

High school students who wish to enroll in the Pre-Dental hygiene curriculum, should request applications directly from the Admissions Offices of the University of Maryland, College Park, Maryland 20742.

Young women or men who wish to prepare for a baccalaureate degree program in dental hygiene should pursue an academic program in high school including the following recommended subjects: biology, chemistry, math, and physics.

PRE-DENTAL HYGIENE STUDENTS

Pre-Dental hygiene students who have completed three semesters of the preprofessional curriculum should request an application at the end of the third semester from the Department of Dental Hygiene, University of Maryland School of Dentistry, Baltimore, Maryland 21201. *Applications for the Baltimore campus should be received no later than June 1 prior to the fall semester for which the student wishes to enroll.*

Only those students who have successfully completed the two year preprofessional curriculum at the University of Maryland or another college or university will be eligible for admission to the Department. *Because enrollment must be limited to 24 students, registration in the pre-professional curriculum does not assure the student of acceptance in the dental hygiene program.* All applicants will be required to submit Dental Hygiene Aptitude Test scores (DHAT information is available from the Department of Dental Hygiene) and to appear for a personal interview at the discretion of the Dental Hygiene Committee on Admissions.

A minimum of C average in the pre-professional curriculum will be required, and preference will be given to those students who have maintained high scholastic records.

REGISTERED DENTAL HYGIENISTS

Registered dental hygienists who have completed a two year accredited dental hygiene program at another college or university, should apply to enroll in the pre-professional curriculum at one of the three University of Maryland campuses. Upon completion of general education, basic and social science, advanced dental hygiene courses and elective requirements at the University of Maryland, dental hygiene credits will be evaluated for transferability by the Department of Dental Hygiene and the Baltimore Campus Director of Admissions. Registered dental hygienists should write directly to the Department of Dental Hygiene for additional information.

Further Information

Information about the pre-professional curriculum or the transfer program for registered dental hygienists may be obtained from Room 203, Turner Laboratory, on the College Park Campus.

THE SCHOOL OF NURSING

The program in professional nursing, leading to the degree of Bachelor of Science in Nursing, is available to women and men students without regard to race, color or creed. The School of Nursing is approved by the Maryland State Board of Examiners of Nurses and accredited by the National League for Nursing.

Admission and Progression

Students interested in nursing should enroll in the college preparatory program in high school. Subjects specifically recommended are biology, chemistry, physics and three units of mathematics. See listing of prenursing courses in Departmental Section.

Admission to the upper division program in the School of Nursing on the Baltimore campus is limited to the number of students that can be accommodated and selection must be made from applicants who are judged to have the most potential for completing the professional program. Academic performance in preprofessional courses is an important factor. It is important that students who enroll in the freshman and sophomore years in preparing for nursing recognize that although every effort is made to continue to expand the enrollment of the professional program on the Baltimore campus, there is no way in which the student can be guaranteed admission to the professional program.

Further Information

Information about the lower division program may be obtained from room 209, Turner Laboratory, on the College Park Campus. Upper division program information may be obtained from the School of Nursing, 655 West Lombard Street, Baltimore, Md. 21201.

THE SCHOOL OF PHARMACY

The purposes of THE SCHOOL OF PHARMACY are to train students for the efficient, ethical practice of all branches of pharmacy; to instruct students in general scientific and cultural subjects so they can read critically, express themselves clearly and think logically as members of a profession and citizens of a democracy; and to guide students into productive scholarship and research for the increase of knowledge and techniques in the healing arts of pharmacy.

The School of Pharmacy is accredited by the American Council on Pharmaceutical Education. The School holds membership in the American Association of Colleges of Pharmacy.

CORRESPONDENCE

All correspondence prior to entrance in the Preprofessional Program of the Five-Year Curriculum at College Park should be addressed to the Director of Admissions, University of Maryland, College Park, Maryland 20742.

All correspondence relative to entrance in the Professional Program of the Five-Year Curriculum should be addressed to the School of Pharmacy, University of Maryland, 636 W. Lombard Street, Baltimore, Maryland 21201.

On the College Park Campus the Pharmacy student advisor's office is in the Turner Laboratory, Room 203, telephone number, 454-2540.

FIVE YEAR PROGRAM

A minimum of five academic years of satisfactory college work is required for the completion of the present pharmacy curriculum of the University of Maryland. This five-year curriculum meets the minimum requirements established by the American Association of Colleges of Pharmacy and the American Council on Pharmaceutical Education.

At the University of Maryland the five-year program consists of two years of a preprofessional and a three-year pharmacy program. The preprofessional program is not available in Baltimore, but may be obtained at the College Park, Baltimore County (UMBC), or Eastern Shore (UMES) Campuses of the University of Maryland or at any other accredited university or junior or senior college where appropriate courses are offered.

Interested secondary school students are invited to write to the Dean of the School of Pharmacy in Baltimore for a catalog concerning the School and for literature about the opportunities in the pharmacy profession.

RECOMMENDED HIGH SCHOOL PREPARATION

The completion of an academic program con-

taining the following courses is required for enrollment in the School of Pharmacy:

Subjects	Recommended Units	Required Units
English	4	4
College Preparatory Mathematics—including algebra (1), plane geometry (1) and additional units in advanced algebra, solid geometry, trigonometry, or advanced mathematics	4	2
Physical Sciences (Chemistry and Physics)	2	1
History and Social Sciences	2	1
Biological Sciences	1	0
Foreign Language—German or French	2	0
Unspecified academic subjects	1	8
Total	16	16

ADMISSION TO THE PROFESSIONAL PROGRAM AT BALTIMORE

Only the three year professional program is offered in Baltimore.

Students of all races, colors and creeds are equally admissible. It is the objective of the University of Maryland Baltimore City Campus to enroll students with diversified backgrounds in order to make the educational experience more meaningful for each student.

From College Park Campus

Students who have completed the prescribed preprofessional program at College Park with a scholastic average of not less than C (2.0), and who are in good standing will be considered for advancement to the pharmacy program in Baltimore, subject to the decision of the Admissions Committee of the School of Pharmacy.

In the semester preceding enrollment in the Baltimore division of the School of Pharmacy each student will be required to file an application with the Baltimore Office of Admissions and Registrations.

PHYSICAL THERAPY

The Department of Physical Therapy offers a four-year program leading to the degree of Bachelor of Science. The first two years of preprofessional requirements may be completed at any of the University of Maryland campuses or any regionally accredited university or college. The last two years of upper division requirements include the professional courses, and is offered on the Baltimore City Campus. The physical therapy curriculum is approved by the Council of Medical Education of the American Medical Association in collaboration with the American Physical Association.

Definition

Physical Therapy is a health care profession whose practitioners work in hospitals, clinics, nursing homes, schools and private practice. Physical therapy practitioners work with patients who are disabled by illness or accident, or were born with a handicap. They evaluate neuromuscular, musculoskeletal, sensory motor, and related cardiovascular and respiratory functions of the patients. They plan and implement initial and subsequent treatment programs on the basis of test findings and within the referral of the licensed physician or dentist with whom they maintain contact regarding the care of the patient. In addition, they try to motivate and instruct the patient, the family, and others who might help during the treatment and convalescent period.

High School Information

Students interested in physical therapy should enroll in the college preparatory program in high school. Subjects specifically recommended are biology, chemistry, physics, and three units of mathematics.

Admission Information

Admission to the lower division is open to all students meeting the university requirements.

Admission to the upper division on the Baltimore City Campus is limited to the number of students that can be accommodated. Selection must be made from applicants judged to have the best potential for academic success and professional excellence.

Students are accepted into the junior class only in the fall semester.

Minority students are encouraged to contact the physical therapy office for advice and guidance in planning their program.

Further Information

See the listing of pre-physical therapy courses in the Departmental Section of this catalog.

Information about the lower division program may be obtained by contacting the department office, Room 202 or 203, Turner Laboratory, College Park, Maryland 20742. Upper Division program information may be obtained by contacting the Department of Physical Therapy, Allied Health Professions Building, 32 S. Green Street, Baltimore, Maryland 21201.

MEDICAL TECHNOLOGY

The University of Maryland Medical Technology program is four years in length, leading to a Bachelor of Science degree. The first three years are devoted to basic studies at the College Park Campus. The last year (12 full months) is spent in clinical studies at University Hospital on the Baltimore City Campus of the University of Maryland.

This program is administered by the School of Medicine. The curriculum in medical technology

complies with the requirements and recommendations of the Board of Schools of the American Society of Clinical Pathologists (and the American Medical Association Council on Medical Education). Graduates of the program will be eligible to take the examination for registration given by the Board of Registry of the American Society of Clinical Pathologists.

Applicants must have a High School Degree and should have at least three years of college preparatory mathematics and three years of science, which involves chemistry and physics.

ADMINISTRATION, SUPERVISION AND CURRICULUM

Faculty: J. Paul Anderson, Vernon E. Anderson, Carl Beckman, Roger V. Bennett, Louise M. Berman, Robert F. Carbone, James Dudley, Thomas Foster, Robert A. Gibson, Harvey Goldman, Ross Hempstead, Roger R. Kelsey, L. Morris McClure, Eugene P. McLoone, Clarence A. Newell, Donald G. Perrin, William L. Reider, Jodellano Statom, Robert E. Stephens, James A. van Zwoll, Desmond P. Wedberg, Gladys A. Wiggin.

The programs in this department are all at the graduate level and include preparation of school superintendents, principals, supervisors, curriculum directors, and administrative specialists in the areas of finance and business administration, personnel administration, public relations, and educational facilities. In addition, there are programs for the preparation of professors and research workers in all of the above areas. Preparation programs leading to administrative positions in junior colleges and other institutions of higher learning are available through a joint major in administration-higher education.

Course Code Prefix—EDAD

AEROSPACE ENGINEERING

Professor and Acting Chairman: Rivello.
Professors: Corning, Melnik, Pai,* and Sherwood.
Associate Professors: Jones and Plotkin.
Assistant Professors: Barlow, Donaldson, Schaeffer, and Weissharr.
Instructor: Greenwood.
Lecturers: Anderson, Billig, Fleig, and Wilson.

An aerospace engineer applies a knowledge of physical sciences and mathematics to the problems of flight through the atmosphere and space. His special areas of study are the behavior of fluids and structures, separately or in combination. Aerospace engineers are concerned with (1) aerodynamics, (2) structural mechanics, (3) propulsion, (4) vehicle dynamics, and (5) the integrated design of flight vehicles. Some aerospace engineers are also involved in the application of advanced aerospace technology to medical, environmental, and surface transportation problems.

The undergraduate curriculum includes basic courses in all areas of aerospace engineering; aerodynamics, structures, structural dynamics, propulsion, flight mechanics, and design. Aerodynamics involves the application of the laws of

*Institute for Fluid Dynamics and Applied Mathematics.

fluid flows to determine the lift, drag and other aerodynamic characteristics of the vehicle. At supersonic speeds the aerodynamicist must include the effects of shock waves, while at reentry speeds the influence of chemical reactions in the atmospheric gas must be considered. The topic of structures is mainly concerned with the ability of the vehicle to withstand the forces created by motion through the vehicle environment. The effects of structural flexibility must be considered and, for flight at high speeds, the aerodynamic heating of the structure can substantially influence vehicle behavior. Structural weight is always of great concern. Propulsion includes studies of reciprocating engine-propeller combinations, gas turbines and rockets with primary emphasis on the determination of the thrust and the fuel consumption rate. An appreciation for the properties of materials at elevated temperatures is essential for both propulsion and structural considerations. Flight mechanics deals with the ability of a vehicle to be flown along desired flight paths. The maneuverability of an aircraft and the handling qualities of a lunar module are both of concern in flight mechanics. Design encompasses all of the facets of aerospace engineering; the aerodynamic, structural and propulsion systems must be integrated to yield a vehicle with suitable flight characteristics and with a capability to perform specific tasks.

The aerospace engineer may be involved in research and development associated with space exploration and earth exploration from space, general aviation, commercial air transportation, or many other related activities. His expertise allows him to make substantial contributions to the advancement of mankind.

AEROSPACE ENGINEERING CURRICULUM

BASIC FRESHMAN YEAR

Course No. and Title	I	II
HLTH 105—Science and Theory of Health	(2)	..
CHEM 103, 104—General Chemistry**	4	4
PHYS 161—General Physics	..	3
MATH 140, 141—Analysis I, II	4	4
ENES 101—Intro Engr. Science	3	..
ENES 110—Mechanics	..	3
General Education Courses	3	3
Physical Activities	(1)	(1)
Total Credits	17	18

Students who are not prepared to schedule MATH 140 are advised to schedule MATH 115 (3 cr.) and ENGL 101 (3 cr.) in the Summer Session before the fall (first) Semester. MATH 115 does not count toward fulfilling the requirements of an engineering degree . . . . . it is a preparation course. Otherwise, students will schedule their freshman year as showing in the following:

ALTERNATE FRESHMAN YEAR

Course	I	II	Summer
HLTH 105—Science and Theory of Health	(2)		
CHEM 103, 104—General Chemistry**	4	4	
PHYS 161—General Physics I			3
MATH 115—Intro. to Analysis ***	3		
MATH 140, 141—Analysis I, II		4	4
ENES 101—Intro. Engr. Science	3		
ENES 110—Mechanics		3	
General Education Courses	3	6	
Physical Activities	(1)	(1)	
Total Credits	16	18	7

Course Code Prefix—ENAE

**Qualified students may elect to take CHEM 105 and 106 (4 cr. hrs. each) instead of CHEM 103 and 104.

***MATH 115 is an additional course for those students who do not qualify to begin with MATH 140.

Sophomore Year	Semester I	Semester II
General Education Courses	3	3
MATH 240—Linear Algebra	4	
MATH 241—Analysis III		4
PHYS. 262, 263—General Physics	4	4
ENES 240—Algorithmic Analysis & Computer Programming	2	
ENES 243—Digital Computer Laboratory	1	
ENES 220—Mechanics of Materials		3
ENAE 201, 202—Introduction to Aerospace Engineering I, II	2	2
ENAE 203—Technical Report Writing	1	
Total	17	16

Junior Year	Semester I	Semester II
General Education Courses	3	3
MATH 246—Differential Equations	3	
ENES 221—Dynamics	3	
ENME 216—Thermodynamics[1]		3
ENEE 300—Principles of Electrical Engineering	3	
ENAE 305—Aerospace Laboratory I		2
ENAE 345—Introduction to Dynamics of Aerospace Systems		3
ENAE 351, 352—Flight Structures I, II[1]	4	3
ENAE 371—Aerodynamics I[1]		3
Total	16	17

Senior Year	Credits
ENAE 471—Aerodynamics II	3
ENAE 475—Viscous Flow & Aerodynamic Heating	3
ENAE 401—Aerospace Laboratory II	2
ENAE 402—Aerospace Laboratory III	1
ENAE 461—Flight Propulsion I	3
General Education	6
Design Elective[2]	3
Applied Dynamics Elective[3]	3
Aerospace Elective[4]	3
Technical Elective[5]	3
Free Elective	3
Total	33

[1] Students planning to take ENAE 462 Flight Propulsion II as a senior elective should take ENME 216, ENAE 371, and ENAE 471 one semester earlier than shown in the above curriculum and delay ENAE 351 and ENAE 352 by one semester.

[2] The student shall take one of the following design courses.
ENAE 411 Aircraft Design
ENAE 412 Design of Aerospace Vehicles

[3] The student shall take one course which utilizes dynamics in a system analysis. The following courses are offered:
ENAE 445 Stability and Control of Aerospace Vehicles
ENAE 455 Aircraft Vibrations

[4] Three credits must be taken from elective courses offered by the Aerospace Engineering Department. Currently offered courses are
ENAE 457 Flight Structures III
ENAE 462 Flight Propulsion II
ENAE 472 Aerodynamics III
ENAE 473 Aerodynamics of High Speed Flight
ENAE 488 Topics in Aerospace Engineering
ENAE 499 Elective Research
Courses listed under 2 and 3 above and not used to meet the requirements of 2 and 3 may also be elected to fulfill requirement 4.

[5] Any 3 credit technical course with a course number of 300 or above may be taken as a technical elective. Courses available as Aerospace Electives may be used as the technical elective

AFRO-AMERICAN STUDIES PROGRAM

Associate Professor and Director: Berry.
Assistant Director: Nzuwah.
Lecturers: Nasibi, Ndissi.
Visiting Associate Professors: Coleman, Kinney.

The program is designed for a student who wants to take a major in an established department, as well as follow a concentration outside his major of 18 hours of upper division course work with an emphasis on black culture and life. For completing this program, the student will receive a Certificate in Afro-American Studies. The work includes courses in art, African languages, anthropology, economics, English, government, history, music and sociology.

An undergraduate in good standing may enroll in the program by consulting with his departmental advisor and an advisor of the Afro-American Studies Program. The student following this program must meet the general university requirements for a degree and those of his college.

To receive a Certificate in Afro-American Studies, the student must enroll and receive a satisfactory grade in at least three (3) of the required courses which must include AASP 401, Seminar in Afro-American Studies. In addition, the student may also choose a number of approved courses from a list of recommended electives to meet the minimum requirements of 18 credit hours.

A student planning to enter the program should consult with the director of Afro-American Studies regarding prerequisites, approved electives and introductory courses.

AGRICULTURE—GENERAL CURRICULUM

The General Agriculture curriculum provides for the development of a broad understanding in agriculture.

The flexibility of this curriculum permits selection of electives that will meet individual vocational plans in agriculture and agriculturally related business and industry.

The science requirement will be satisfied by completing the following courses:

BOTN 100—General Botany	4
CHEM 103,104—College Chemistry I, II	4,4
ZOOL 101—General Zoology	4

General Agriculture Requirements	Semester Credit Hours
AGEN 100—Introduction to Agricultural Engineering	3
AGEN 200—Introduction to Farm Mechanics	2
AGRO 100—Crop Production Laboratory	2
AGRO 202—General Soils	4
AGRO 407—Cereal Crop Production	2
AGRO 406—Forage Crop Production	2
AGRO 451—Cropping Systems	2
ANSC 101—Principles of Animal Science	3
ANSC 203—Feeds and Feeding	3
ANSC 242—Dairy Production	3
ANSC 262—Commercial Poultry Management	3
AREC 250—Elements of Agricultural Economics	3
AREC 251—Marketing of Agricultural Products	3
BOTN 221—Diseases of Plants	4
ENTM 252—Insect Pests of Agricultural Crops	3
HORT 111—Tree Fruit Production	3
or	
HORT 222—Vegetable Products	3
RLED 464—Rural Life in a Modern Society	3
Elect either of the following pairs of courses:	
BOTN 414—General Plant Genetics and MICB 200—General Microbiology	2,4
or	
BSAD 220, 221—Principles of Accounting	3,3
Electives	20

AGRICULTURAL AND EXTENSION EDUCATION

Professor and Acting Department Chairman: Poffenberger.
Professors: Longest and Ryden.
Associate Professor: Nelson.
Assistant Professors: Klement, Seibel, Sorter.
Instructors: Glee and Tennant.

Programs are offered in education and other applied behavioral sciences needed by persons preparing to teach agriculture or to enter extension work, community development, and other continuing education careers.

Two undergraduate curriculum options are available. The agricultural education curriculum is designed primarily for persons who wish to prepare for teaching agriculture in the secondary schools. The extension education curriculum is designed for those preparing to enter the Cooperative Extension Service or other agencies engaged in educational and development programs. Either option may lead to a variety of other career opportunities in public service, business and industry, communications, research, and college teaching.

Students preparing to become teachers of agriculture—including horticulture, agribusiness or other agricultural related subjects—should have had appropriate experience with the kind of agriculture they plan to teach or should arrange to secure that experience during summers while in college.

In order to be able to serve as advisors of high school chapters of the FFA upon graduation, students in the agricultural education curriculum are expected to participate in the Collegiate Chapter of the Future Farmers of America.

The science requirement will be satisfied by completing 20 credit hours from the following courses:

	Semester Credit Hours
BOTN 100—General Botany	4
CHEM 103, 104—College Chemistry I, II	4,4
MATH 105—Fundamentals of Math	4
ZOOL 101—General Zoology	4
DEPARTMENT REQUIREMENTS, BOTH OPTIONS	
ANSC 101—Principles of Animal Science	3
ANSC 203—Feeds and Feeding	3

AGRO 100—Crops Laboratory	2
AGRO 102—Crop Production, or AGRO 406—Forage Crop Production	2
AGRO 202—General Soils	4
AGEN 100—Introduction to Agricultural Engineering	4
AREC 407—Financial Analysis of the Farm Business, or AREC 406—Farm Management	3
RLED 464—Rural Life in Modern Society	3
RLED 303—Teaching Materials and Demonstrations	2
ENTM 252—Insect Pests of Agricultural Crops	4
BOTN 221—Diseases of Plants	4
HORT 231—Greenhouse Management, or HORT 222—Vegetable Production, or HORT 271—Plant Propagation.	3

AGRICULTURAL EDUCATION OPTION

RLED 313—Student Teaching	5
RLED 315—Student Teaching	1-4
RLED 302—Introduction to Agricultural Education	2
RLED 311—Teaching Secondary Vocational Agriculture	3
RLED 305—Teaching Young and Adult Farmer Groups	1
EDUC 300—Human Development and Learning	6
EDUC 301—Foundations of Education	3
AGEN 200—Introduction to Farm Mechanics	2
AGEN 305—Farm Mechanics	2
RLED 398—Seminar in Agricultural Education	1
Approved Electives	15

EXTENSION EDUCATION OPTION

RLED 422—Extension Education	2
RLED 423—Extension Communications	2
RLED 323—Developing Youth Programs	3
RLED 325—Directed Experience in Extension Education	1-5
PSYC 100—Introduction to Psychology	3
PSYCH 221—Social Psychology	3
EDHD 160—Educational Psychology	3
AREC 452—Economics of Resource Development	3
Approved Electives	20

Course Code Prefix—RLED

AGRICULTURAL AND RESOURCE ECONOMICS

Professor and Chairman: Curtis.

Professors: Beal, Bishop, Foster, Ishee, Lessley, Moore, Murray, Poffenberger, Smith, Stevens, Tuthill, and Wysong.

Associate Professors: Beiter, Bender, Cain, Hardie, Hoecker, and Via.

Assistant Professors: Holmes, Lawrence and Marasco.

Faculty Research Associate: Bellows.

Visiting Professors: Evans and Waugh.

Visiting Associate Professor: Bell.

Visiting Assistant Professors: Carlson, Fullenbaum, Noetzel, Vondruska.

Visiting Faculty Research Associate: Kinoshita.

The curriculum in Agricultural and Resource Economics combines training in the business, economics and international aspects of agricultural production and marketing with the biological and physical sciences basic to agriculture. Programs are available for students in agricultural economics, agricultural business, international agriculture, and resource economics. Students desiring to enter agricultural marketing or business affiliated with agriculture may elect the agricultural business option; and those interested in foreign service may elect the international agriculture option. Students primarily interested in the broad aspects of production and management as it is related to the operation of a farm business may elect the agricultural economics option. Those interested in training in the broad area of resource management and evaluation may elect the resource economics option.

In these programs, students are trained for employment in agricultural business firms; for positions in sales or management; for local, state, or federal agencies; for extension work; for high school and college teaching; for research, and for farm operation or management.

Courses for the freshman and sophomore years are essentially the same for all students. In the junior year the student selects the option of his choice. Courses in this department are designed to provide training in the application of economic principles to the production, processing, distribution, and merchandising of agricultural products and the effective management of our natural and human resources, as well as the inter-relationship of business and industry associated with agricultural products. The curriculum includes courses in general agricultural economics, marketing, farm management, prices, resource economics, agricultural policy, and international agricultural economics.

The science requirement will be satisfied by completing 16 credit hours from the following courses:

	Semester Credit Hours
BOTN 100—General Botany	4
CHEM 103,104—College Chemistry I,II	4,4
MATH 220,221—Elementary Calculus	3,3
MICB 200—General Microbiology	4
PHYS 111—Elements of Physics	3
ZOOL 101—General Zoology	4

REQUIRED OF ALL STUDENTS

AREC 404—Prices of Agricultural Products	3
BSAD 220—Principles of Accounting	3
BSAD 230—Business Statistics I	3
or AGRI 301—Introduction to Agricultural Biometrics	3
ECON 201—Principles of Economics I	3
ECON 203—Principles of Economics II	3
ECON 401—National Income Analysis	3
ECON 403—Intermediate Price Theory	3
MATH 110—Introduction to Mathematics	3
MATH 111—Introduction to Mathematics	3
MATH 220—Elementary Calculus	3

A minimum of nine hours of technical agriculture must be selected in consultation with the student's advisor.

The student's total program must contain a minimum of 15 credit hours of courses in Agricultural and Resource Economics.

AGRIBUSINESS OPTION

Each student must take the following courses:

AREC 406—Farm Management	3
AREC 416—Marketing Management of Agribusiness Enterprises	3
AREC 427—Agricultural Commodity Markets: An Economic Analysis	3
AREC 432—Agricultural Policy and Programs	3

AGRICULTURAL ECONOMICS OPTION

Each student must take 12 hours as follows:

AREC 406—Farm Management	3
ECON 425—Mathematical Economics	3
or	
ENGL 291—Expository Writing	3
MATH 221—Elementary Calculus	3
Statistics	3

INTERNATIONAL AGRICULTURE OPTION

Each student must take the following:

AREC 444—World Agricultural Production and Trade	3
AREC 445—Foreign Agricultural Economies	3
ECON 415—Introduction to Economic Development of Underdeveloped Areas	3
ECON 440—International Economics	3

RESOURCE ECONOMICS OPTION

Each student must take the following:

AREC 240—Environment and Human Ecology	3
AREC 452—Economics of Resource Development	3
ECON 450—Introduction to Public Finance	3

Course Code Prefix—AREC

AGRICULTURAL CHEMISTRY CURRICULUM

This curriculum insures adequate instruction in the fundamentals of both the physical and biological sciences. It may be adjusted through the selection of electives to fit the student for work in agricultural experiment stations, soil bureaus, geological surveys, food laboratories, fertilizer industries, and those handling food products.

The science requirement will be satisfied by completing 16 credit hours from the following courses:

	Semester Credit Hours
BOTN 100—General Botany	4
MICB 200—General Microbiology	4
ZOOL 101—General Zoology	4
and	
CHEM 103, 104—College Chemistry I, II	4,4

REQUIRED OF ALL STUDENTS:

CHEM 203—College Chemistry IV	3
CHEM 204—College Chemistry IV Laboratory	2
CHEM 201—College Chemistry III	3
CHEM 202—College Chemistry III Laboratory	2
CHEM 421—Advanced Quantitative Analysis or	3
CHEM 321—Intermediate Quantitative Analysis	4
AGRO 202—General Soils	4
GEOL 100—Geology	3
MATH 141—Analysis II	4
Modern Languages	12
PHYS 141—General Physics	4
PHYS 142—General Physics	4
Electives in Biology	6
Electives in Agricultural Chemistry	6

AGRICULTURAL ENGINEERING

Professor and Acting Chairman: Harris.
Professor: Winn.
Associate Professors: Cowan, Felton and Merkel.
Assistant Professors: Hummel, Rebuck and Stewart.
Research Associate: Wheaton.
Visiting Research Associate: Willson.

Agricultural engineering utilizes both the physical and biological sciences to help meet the needs of our increasing world population for food, natural fiber and improvement or maintenance of the environment. Scientific and engineering principles are applied to the conservation and utilization of soil and water resources for food production and recreation; to the utilization of energy to improve labor efficiency and to reduce laborious and menial tasks; to the design of structures and equipment for housing or handling of plants and animals to optimize growth potential; to the design of residences to improve the standard of living for the rural population; to the development of methods and equipment to maintain or increase the quality of food and natural fiber; to the flow of supplies and equipment to the agricultural and aquacultural production units; and to the flow of products from the production units and the processing plants to the consumer. The agricultural engineer places emphasis on maintaining a high quality environment as he works toward developing efficient and economical engineering solutions.

The undergraduate curriculum provides opportunity to prepare for many interesting and challenging careers in design, management, research, education, sales, consulting, or international service. The program of study includes a broad base of mathematical, physical and engineering sciences combined with basic biological sciences. Twenty hours of electives give flexibility so that a student may plan a program according to his major interest.

Course Code Prefix—AGEN

	Semester Credit Hours
DEPARTMENTAL REQUIREMENTS	
AGEN 324—Engineering Dynamics of Biological Materials	3
AGEN 424—Functional and Environmental Design of Agricultural Structures	3
AGEN 343—Functional Design of Machinery and Equipment	3
AGEN 421—Power Systems	3
AGEN 422—Soil and Water Engineering	3
ENCE 350—Structural Analysis	3
ENES 101—Intro Engineering Science	3
ENES 110—Mechanics	3
ENES 220—Mechanics of Materials	3
ENES 221—Dynamics	3
ENME 300—Materials Science and Engineering	
or	
ENCE 300—Fund. of Engineering Materials	3
ENME 216—Thermodynamics	3
ENME 342 or ENCE 330—Fluid Mechanics	3
ENEE 300—Prin. of Electrical Engineering	3
MATH 140,141—Analysis I, II	4,4
MATH 240—Linear Algebra	4
MATH 246—Differential Equations	
or	
ENCE 381—Applied Math in Engineering	
or	
ENME 380—Applied Math in Engineering	3
ZOOL 101—General Zoology	
or	
BOTN 100—General Botany	4
CHEM 103, 104—College Chemistry, I, II	4,4

PHYS 161, 262, 263—General Physics	3,4,4
Technical Electives*	14
General University Requirements**	30
Electives	6

*Technical electives, related to field of concentration, must be selected from a departmentally approved list. Eight credits must be 300 level and above.

**Students must consult with departmental advisors to ensure the selection of appropriate courses for their particular program of study.

AGRONOMY

Professor and Department Chairman: J. Miller.

Professors: Axley, Clark, Decker, Hoyert and Strickling.

Associate Professors: Aycock, Fanning, Foss, F. Miller and Schillinger.

Assistant Professors: Bezdicek, Burt, Hall, Mulchi, Necomer and Shannon.

The Department of Agronomy offers instruction in crop science and soil science. A turf and urban agronomy option is offered under crop science and a conservation of soil, water and environment option is offered under soil science. These options appeal to students who are interested in urban problems or environmental science. The agronomy curricula are flexible and allow the student either to concentrate on basic science courses that are needed for graduate work or to select courses that prepare him for employment at the bachelor's degree level as specialists with park and planning commissions, road commissions, extension service, soil conservation service, and other governmental agencies. Many graduates with the bachelor's degree are also employed by private corporations such as golf courses and seed, fertilizer, chemical, and farm equipment companies.

Students completing graduate programs are prepared for college teaching and research, or research and management positions with industry and governmental agencies.

Additional information on opportunities in agronomy may be obtained by writing to the Department of Agronomy.

Course Code Prefix—AGRO

The science requirement will be satisfied by completing:

	Semester Credit Hours
CHEM 103,104—College Chemistry I,II	4,4

and selecting eight semester credits hours from the following courses:

BOTN 100—General Botany	4
MICB 200—General Microbiology	4
ZOOL 101—General Zoology	4

or

other courses selected from CHEM, MATH or PHYS.

DEPARTMENTAL REQUIREMENTS (CROP SCIENCE)

	Semester Credit Hours
AGRO 100—Crops Laboratory	2
AGRO 202—General Soils	4
AGRO—Advanced Crops Courses	6
AGRO—Advanced Soils Courses	6
AGRO 398—Senior Seminar	1
BOTN 212—Plant Taxonomy	3
BOTN 221—Diseases of Plants	4
BOTN 441—Plant Physiology	4
Electives	15
Major electives approved by crops advisor	28

TURF AND URBAN AGRONOMY OPTION

A student following this option in the crop science curriculum must include the following courses among his major electives:

	Semester Credit Hours
AGRO 405—Turf Management	3
AGRO 415—Soil Survey and Land Use	3
HORT 160—Introduction to the Art of Landscaping	3
HORT 453—Woody Plant Materials	3
RECR 495—Planning, Design and Maintenance of Park and Recreational Areas and Facilities	3

DEPARTMENTAL REQUIREMENTS (SOIL SCIENCE)

	Semester Credit Hours
AGRO 100—Crops Laboratory	2
AGRO—Advanced Crops Courses	4
AGRO 202—General Soils	4
AGRO 414—Soil Classification and Geography	4
AGRO 417—Soil Physics	3
AGRO 421—Soil Chemistry	3
AGRO 398—Senior Seminar	1
GEOL 100—Introductory Physical Geology	3
GEOL 110—Physical Geology Laboratory	1
Major electives approved by soils advisor	34
Electives	15

CONSERVATION OF SOIL, WATER AND ENVIRONMENT OPTION

A student following this option in the soil science curriculum must include the following courses among his major electives:

	Semester Credit Hours
AGRO 412—Soil and Water Conservation	3
AGRO 423—Soil-Water Pollution	3
AGEN 432—General Hydrology	3
BOTN 211—Principles of Conservation	3
AGRO 415—Soil Survey and Land Use	3
AGRI 489—Special Topics in Agriculture: Air Pollution Biology	3
GEOG 445—Climatology	3

AMERICAN STUDIES PROGRAM

Professor and Chairman: Beall.

Associate Professor: Lounsbury.

Assistant Professor: Mintz.

Advisory Committee: Beall (Chairman, American Studies), Lutwack (English), Grimsted (History), Lounsbury (American Studies), Mintz (American Studies), Schwartz (Sociology), Ex Officio: Aylward (Interim Dean of the College of Arts and Sciences) and Sparks (Dean of Graduate Studies and Research).

The University has a comprehensive program in American Studies. It begins with the general education courses on the freshman and sophomore levels, and includes a major for juniors and seniors. The student who majors in American Studies

has the advantage of being taught by specialists from various departments. Prerequisites: six hours of American history or American literature or three hours of each.

The program is intended to have generous breadth, but the danger of securing breadth without depth is offset by the requirement of an area of concentration in either English or history.

The undergraduate major requires 42 semester hours (24 hours minimum at the 300-400 level), consisting of courses in American Studies and various related disciplines. Courses related to American Studies are offered in the following departments:

English, History, Government and Politics, Sociology, Afro-American Studies, Anthropology, Architecture, Art, Comparative Literature, Dramatic Arts, Economics, Education, Geography, Journalism, Music, Philosophy, Psychology, Radio and Television, and Speech.

A major in American Studies will follow this curriculum:

1. American Studies 426, 427 (Culture and the Arts in America) or American Studies 436, 437 (Readings in American Studies) in the junior year and American Studies 446, 447 (Popular Culture in America) in the senior year.
2. Twelve hours of either American literature or history.
3. Nine hours in each of two of the remaining above listed departments.
4. To meet the nine hour requirement in one of the related areas, a student, with the approval of his advisor, may substitute related courses from one of the following sequences:

   Afro-American Studies. Related courses in art, English, government, history and sociology.

   Area Studies and Comparative Culture. The study of one foreign culture. Courses must be drawn from at least two of the following fields: art, comparative literature, English, history, and a foreign language.

   Creative and Performing Arts. Production, studio or technical courses in art, English, music, radio and television.

   Personality and Culture. Related courses in anthropology, education, and psychology.

   Philosophy and Fine Arts. Related courses in art, music, and philosophy.

   Popular Arts and Mass Communications. Related courses in dramatic arts, journalism, radio and television.

   Urban and Environmental Studies. Related courses in architecture, economics, government, and sociology.

Course Code Prefix—AMST

ANIMAL SCIENCES

Department of Animal Science

Professor and Chairman: Young.
Professors: Green and Leffel.
Associate Professor: Buric.
Assistant Professors: DeBarthe and McCall.

Department of Dairy Science

Professor and Chairman: Davis.
Professors: Cairns, Vandersall and Williams.
Assistant Professors: Buchman, Bull and Douglass.

Department of Poultry Science

Associate Professor and Chairman: Thomas.
Professor: Shaffner.
Associate Professors: Bigbee and Creek.
Assistant Professors: Carter, Heath, Pollard, Soares and Wabeck.

Department of Veterinary Science

Professor and Chairman: Hammond.
Associate Professors: Dutta, Johnson, Marquardt, and Mohanty.
Assistant Professors: Albert and Ingling.

The curriculum in animal science offers a broad background in general education, basic sciences, and agricultural sciences, and the opportunity for a student to emphasize that phase of animal agriculture in which he is specifically interested. Each student will be assigned to an advisor according to the program he plans to pursue.

Objectives

The following specific objectives have been established for the program in animal sciences.

1. To acquaint students with the role of animal agriculture in our cultural heritage.
2. To prepare students for careers in the field of animal agriculture. These include positions of management and technology associated with animal, dairy, or poultry production enterprises; positions with marketing and processing organizations; as well as in other allied fields such as feed, agricultural chemicals and equipment firms.
3. To prepare students for entrance to veterinary schools.
4. To prepare students for graduate study and subsequent careers in teaching, research and extension, both public and private.
5. To provide essential courses for the support of other academic programs of the University.

The science requirement will be satisfied by completing:

	Semester Credit Hours
CHEM 103,104—College Chemistry I,II	4,4
and selecting eight semester credit hours from the following courses:	
BOTN 100—General Botany	4
MICB 200—General Microbiology	4
ZOOL 101—General Zoology	4

DEPARTMENTAL REQUIREMENTS

FDSC 111—Introduction to Food Science	3
ANSC 101—Principles of Animal Science	3
ANSC 201—Principles of Animal Genetics	3
ANSC 401—Fundamentals of Nutrition	3
ANSC 212—Applied Animal Physiology	4
ANSC 211—Anatomy of Domestic Animals	4
ANSC 412—Introduction to Diseases of Animals	3
Mathematics or Biometrics or both	6
Plus one course in each of the following disciplines:	
Agronomy	2-4
Agricultural Engineering	2-4
Entomology	2-4
Economics	2-4
Physics or Organic Chemistry	2-4
	55-65
Electives	28-38

Electives must include at least 9 credit hours in ANSC courses beyond those listed above.

For students interested in a program of study with major emphasis on beef cattle, sheep and swine, it is suggested that the elective courses include the following:

	Semester Credit Hours
ANSC 221—Fundamentals of Animal Production	3
ANSC 222—Livestock Evaluation	3
ANSC 223—Seminar	1
ANSC 301—Advanced Livestock Judging	2
ANSC 402—Applied Animal Nutrition	3
ANSC 422—Meats	3
ANSC 423,424—Livestock Management	6
ANSC 426—Principles of Breeding	3

For students interested in a program of study with major emphasis on dairying, it is suggested that the elective courses include the following:

ANSC 242—Dairy Production	3
ANSC 244—Dairy Cattle Type Appraisal	1
ANSC 442—Dairy Cattle Breeding	3
ANSC 446—Physiology of Mammalian Reproduction	3

For students interested in a program of study with a major emphasis on poultry, it is suggested that the elective courses include the following:

ANSC 261—Advanced Poultry Judging	1
ANSC 262—Commercial Poultry Management	3
ANSC 452—Avian Physiology	2
ANSC 462—Physiology of Hatchability	1
ANSC 464—Poultry Hygiene	3
ANSC 466—Avian Anatomy	3
FDSC 461—Technology of Market Eggs and Poultry	3

Students desiring a combination of training in one of the animal sciences and emphasis on business may choose elective courses from the following:

BSAD 110—Business Enterprise	3
BSAD 220—Principles of Accounting	3
BSAD 230—Business Statistics	3
BSAD 380—Business Law	3
MATH 110—Introduction to Math	3
ECON 205—Fundamentals of Economics	3
ECON 430—Money and Banking	3
BSAD 350—Marketing Principles and Organization	3
AGRI 401—Agricultural Biometrics	3

Course Code Prefix—ANSC

ANTHROPOLOGY PROGRAM

Professor and Director: Kerley.
Associate Professors: Anderson, Hoffman, Rosen and Williams.
Assistant Professors: Dessaint, Migliazza and Thurman.
Visiting Lecturer: Ortner.
Instructor: Schacht.

The Anthropology Program offers beginning and advanced course work in the four principal subdivisions of the discipline: physical anthropology, linguistics, archaeology and ethnology. Courses in these subdivisions may be used to fulfill the minor or "supporting courses" requirement in some programs leading to the B.A. degree. They also may, at the discretion of the Department of Sociology, be counted toward a major in Sociology.

Anthropology Major: The fulfillment of the requirements for a major in anthropology leads to the B.A. degree. All majors are required to take 30 hours in anthropology, 18 of which must be selected from the following courses: ANTH 101, 102, 401, 441, or 451, 371 or 461, and 397. It should be noted, however, that if ANTH 101 is used to satisfy the General Education requirement in Social Science, it may not be counted as a part of the 30 required semester hours for the major. The 18 hours of required courses insures that the major becomes familiar with all areas of anthropology. No one area therefore, receives special emphasis, for it is believed that such specialization should occur during graduate study, preferably at the Ph.D. level. Thus the student is broadly prepared in the ways man has evolved culturally and physically. A statement of course requirements and recommended sequences of courses is available in the departmental office.

No course with a grade of less than C may be used to satisfy major requirements.

ANTH 101 or its equivalent, or permission of the instructor, is prerequisite to all other courses in Anthropology.

Course Code Prefix—ANTH

ARCHITECTURE

Professor and Dean: Hill.
Professors: Cochran (part-time), Passonneau, Schlesinger, Skiadaressis (visiting) and Wiebenson.
Associate Professors: Hutton, Potts, Schack (part-time) and Shaeffer.
Assistant Professors: Bechhoefer, Chabrowe, Fullenwider, Jadin, Kaskey, Lazaris, Lewis, Payne and Senkevitch.
Lecturers: Adams, Fogle, Hartman, Kramer, Moore, Thomas and Wilkes.
Assistant Dean: Fogle.
Administrative Assistant: Ratcliff.

Curator of Visual Aids: Alley.
Librarian: Neal.

Students in architecture are required to complete a minimum of 167 credits of work for the Bachelor of Architecture degree. In addition to prescribed courses in the School of Architecture, students are required to complete a number of credits in electives offered elsewhere in the University. The requirements for graduation are tabulated below:

	Credits
Int. to Blt. Env.	3
Studio Courses	36
Systems and Technology Courses	20
Architectural History Courses	12
Math	9
Computer Science	3
Physics and Biology	7
Theories of Urban Form	3
Site Analysis	3
Visual Design	3
Professional Management	2
Professional Electives	21 to 33
Electives	5 to 17
General (see curriculum)	24
P.E.	(2)
Health	(2)
(minimum)	167

Distribution	Credits
Minimum architecture courses	82
General Education, Math, Physics, Health and P.E.	47
Professional Electives and Electives	38
	167

Five-Year Curriculum in Architecture

FIRST YEAR

Arch 170 Int. to Blt. Env.	3	Prof. El.	3
Math 115	3	Math 220	3
English 101	3	English 201	3
Social Science option	3	Social Science option	3
History option	3	History option	3
P.E.	1	Professional Elective	1
		Health	2
	16		18

SECOND YEAR

Arch 200 Basic Env. Des.	4	Arch 201 Basic Env. Des.	4
Arch 220 History of Arch.	3	Arch 221 History of Arch.	3
Arch 214 Bldg. Constr.	2	Arch 215 Bldg. Constr.	2
Physics 121	4	English 202	3
Math 221	3	Biology 101	3
	16		15

THIRD YEAR

Arch 300 Arch. Studio I	4	Arch 301 Arch. Studio II	4
Arch 310 Bldg. Systems I	4	Arch 311 Bldg. Systems II	4
Arch 360 Site Analysis	3	Arch 342 Visual Design	3
Fine Arts option	3	CMSC 101 or Arch 314 Computer Applications in Arch.	3
Arch. History or Theory option	3	Arch History or Theory option	3
	17		17

FOURTH YEAR

Arch 400 Arch. Studio III	4	Arch 401 Arch. Studio IV	4
Arch 410 Bldg. Systems III	4	Arch 411 Bldg. Systems IV	4
Arch 350 Theories of Urban Form	3	Prof. El.	3
Prof. El.	3	Prof. El. or El.	6
Prof. El. or El.	3		
	17		17

FIFTH YEAR

Arch 500 Adv. Top. Prob.	6	Arch 501 Adv. Top. Prob.	6
Arch 570 Prof. Mgmt.	2	Prof. El.	6
Prof. El.	6	Prof. El. or El.	3
El.	3	El.	2
	17		17

PROFESSIONAL ELECTIVES

The following courses are presently accepted by the faculty in architecture as meeting the professional elective requirements.

Course No. and Name		Credits	Prerequisites
Anthropology			
101	Intro. to Anth: Archaeol. and Phy.	3	Meets G.E.
102	Intro. to Anth: Cult. Anth. and Ling.	3	none
221	Man and Environment	3	Soph. stdg.
241	Intro. to Archaeology	3	Soph. stdg.
401	Cultural Anthropology	3	ANTH 101, 102, 221
441	Archaeology of Old World	3	ANTH 101, 241
451	Archaeology of New World	3	ANTH 101, 241
Architecture			
240	Basic Photography	2	Perm. of Instr.
242	Drawing I	2	Perm. of Instr.
170	Introduction to the Built Environment	3	120 & 121 or Perm. of Instr.
322	Studies in Medieval Architecture	3	120 & 121 or Perm. of Instr. (Meets ARCH Hist. Req.)
324	Studies in Renaissance Architecture	3	120 & 121 or Perm. of Instr. (Meets ARCH Hist. Req.)
326	Studies in Modern Architecture	3	120 & 121 or Perm. of Instr. (Meets ARCH Hist. Req.)
340	Advanced Photography	2	ARCH 240 Perm. of Instr.
342	Studies in Visual Design	3	ARCH 201 Perm. of Instr.
352	The Architect in the Community	3	Perm. of Instr.
370	Theories and Lit. of Architecture	3	Perm. of Instr.
372	Signs, Symbol and Messages in Arch.	3	Perm. of Instr.
374	Computer Aided Envir. Design	3	ARCH 201, CMSC 103
376	The Architectural Program as a form Generator	3	Perm. of Instr.
413	Structural Systems in Architecture	3	ARCH 410 or Perm. of Instr.

420	History of American Architecture, 17th century to 19th century	3	ARCH 220 & 221 (Meets ARCH Hist. Req.)
421	Seminar in American Architecture	3	ARCH 220 & 221 (Meets ARCH Hist. Req.)
422	Late 18th Century Parisian Architecture	3	ARCH 220 & 221 (Meets ARCH Hist. Req.)
424	History of Russian Architecture	3	(Meets ARCH Hist. Req.)
426	Readings in Cont. Arch.	3	(Meets ARCH Hist. Req.)
427	Independent Studies in the History of Arch.	3	Perm. of Instr. (Meets ARCH Hist. Req.)
430	Problems and Methods of Arch. Preservation	3	(Meets ARCH Hist. Req.)
450	Introduction to Urban Planning	3	Perm. of Instr.
472	Economic Determinants of Architecture	3	Perm. of Instr.
478	Directed Studies in Architecture	1-4	Perm. of Instr.
512	Advanced Structural Analysis in Architecture	3	ARCH 411
514	Environmental Systems in Architecture	3	ARCH 411

Business Administration

362	Labor Relations	3	Jr. stdg.
370	Prin. of Transportation	3	ECON 205 and jr. stdg.
474	Urban Trans. and Urb. Dev.	3	ECON 205 and
380, 381	Business Law	3	jr. stdg.
393	Real Estate Prin.	3	ECON 205 and
490	Urban Land Management	3	jr. stdg.

Computer Science

210	Languages and Struct. Computers	3	CMSC 103
440	Struct. of Programming Lang.	3	Jr. stdg., CMSC 210
420	Data and Storage Structures	3	Jr. stdg., CMSC 210

Economics

205	Fund. of Economics	3	Soph. stdg.
491	Intro. to Reg. and Urban Econ.	3	Perm. of Instr.
450	Intro. to Public Finance	3	ECON 205
454	State and Local Public Finance	3	ECON 205
461	Economics of American Industry	3	ECON 205

General Education

260	Intro. to Interdisciplinary Urban Studies	3	

Geography

201	General Geography	3	none
452	Population Geography	3	GEOG 201, Perm. of Instr.
455	Urban Geography	3	Jr. stdg.

Geology

100	Geology	3	none
110	Physical Geology Lab.	1	none

Information System Management

401	Electronic Data Processing	3	Jr. stdg., CMSC 103
402	Electronic Data Processing Applications	3	Jr. stdg., IFSM 401

Psychology

100	Intro. to Psych.	3	Meets G.E.
221	Social Psychology	3	PSYC 1
462	Engineering Psychology	3	PSYC 1 or Perm. of Instr.

Sociology

100	Intro. to Sociology	3	
120	Urban Sociology	3	Meets G.E.
210	Social Pathology	3	SOCY 1
471	The Rural Community	3	SOCY 1, soph. stdg.
473	The City	3	SOCY 1, jr. stdg.
330	Community Organization	3	SOCY 1, jr. stdg.
423	Ethnic Minorities	3	SOCY 1, jr. stdg.
424	Sociology of Race Relations	3	SOCY 1, jr. stdg.
445	Sociology of the Arts	3	SOCY 1, jr. stdg.

Statistics and Probability

250	Intro. to Random Variables	4	

Art

110	Life Drawing	3	

Course Code—ARCH

ART

Professor and Chairman: Levitine.
Professors: deLeiris, Jamieson, Lembach, Lynch and Maril.
Associate Professors: Bunts, Campbell, Denny, Longley, Pemberton, Rearick and Stites.
Assistant Professors: DiFederico, Dillinger, Farquhar, Forbes, Gelman, Green, Isen, Klank, Niese and Withers.
Lecturers: deMonte, Ferraioli, Green, Griffin, Hommel, Jordan, Landgren, Lapinski, Lewis, Matthews, Rejszel, Schwartz, Simkin, Spiro and Valtchev.
Instructors: M. deLeiris, Griffin and Reid.

Two majors are offered in art: art history and studio. The student who majors in art history is committed to the study and scholarly interpretation of existing works of art, from the prehistoric era to our times, while the studio major stresses the student's direct participation in the creation of works of art.

In spite of this difference, both majors are rooted in the concept of art as a humanistic experience, and share an essential common aim: the development of aesthetic sensitivity, understanding and knowledge. For this reason, students in both majors are required to progress through a "common curriculum," which will ensure a broad grounding in both aspects of art; then each student will move into a "specialized curriculum" with advanced courses in his own major.

A curriculum leading to a degree in art education is offered in the College of Education with the cooperation of the Department of Art.

COMMON CURRICULUM

(Courses required in major unless taken as part of supporting area as listed below.)

ARTH 100. Introduction to Art. (3)
ARTH 260. History of Art. (3)
ARTH 261. History of Art. (3)
ARTS 100. Design I. (3)
ARTS 110. Drawing I. (3)

SPECIALIZED CURRICULUM

ART HISTORY MAJOR A

5 junior-senior level History of Art courses (one each from 3 of the following areas: Ancient-Medieval, Renaissance-Baroque, 19th-20th century, non-Western). (15)

1 additional Studio Art course. (3)

Supporting Area (from any Arts and Sciences area except Art):

4 courses, 2 of which, taken in one department, must be at junior-senior level. (12)

ART HISTORY MAJOR B

5 junior-senior level History of Art courses (one each from 3 of the following areas: Ancient-Medieval, Renaissance-Baroque, 19th-20th century, non-Western). (15)
3 additional courses in any level History of Art. (9)

Supporting Area in Studio Art

ARTS 100. Design I (from Common Curriculum).
ARTS 110. Drawing I (from Common Curriculum).
2 Studio Art courses at junior-senior level. (6)

Total required credit hours, combined major and supporting area—45.

Additional history of art or studio courses may be applied; total combined art hours may not exceed 42 in Major A, or 54 in combined major and supporting area in major B.

STUDIO ART MAJOR A

ARTS 200. Intermediate Design. (3)
ARTS 210. Drawing II. (3)
ARTS 220. Painting I. (3)
ARTS 310. Drawing III. (3)
ARTS 330. Sculpture I. (3)
ARTS 340. Printmaking I. (3)

1 additional junior-senior level studio course. (3)
1 advanced History of Art course. (3)

Supporting Area (from any arts and sciences area except Art).

4 courses, 2 of which, taken in one department, must be at junior-senior level. (12)

STUDIO ART MAJOR B

ARTS 200. Intermediate Design. (3)
ARTS 210. Drawing II. (3)
ARTS 220. Painting I. (3)
ARTS 310. Drawing III. (3)
ARTS 330. Sculpture I. (3)
ARTS 340. Printmaking I. (3)

1 additional junior-senior level Studio Art course. (3)

Supporting Area in History of Art

ARTH 260. History of Art (from Common Curriculum).

ARTH 261. History of Art (from Common Curriculum).

2 History of Art courses at junior-senior level. (6)

Total required credit hours, combined major and supporting Area—51 in major A, 42 in major B.

No course with a grade less than C may be used to satisfy major requirements.

Course Code Prefixes—ARTE, ARTH, ARTS

ASTRONOMY PROGRAM

Professor and Chairman of Physics and Astronomy: Laster.

Professor and Director of Astronomy: Westerhout.

Professors: Brandt (P.T.), Erickson, Kerr, Kundu, Opik (P.T.)

Associate Professors: A'Hearn, Bell, Matthews, Rose, Smith, Wentzel, Zipoy, Zuckerman.

Assistant Professors: Harrington, Simonson.

Teaching Associate: Knapp.

Assistant Instructor: Gilmore.

The Department of Physics and Astronomy offers a major in Astronomy. The Astronomy Program office is located in the Space Sciences Building. Astronomy students are given a strong undergraduate preparation in astronomy, physics and mathematics, as well as encouragement to take a wide range of other liberal arts courses. The Astronomy Program is designed to be quite flexible, in order to take advantage of students' special talents or interests after the basic requirements for a sound astronomy education have been met. Students preparing for graduate studies will have an opportunity to choose from among many advanced courses available in astronomy, mathematics and physics. The program is designed to prepare students for graduate work as well as for positions in governmental and industrial laboratories and observatories.

Students intending to major in astronomy who have had a high school course in physics and who have adequate preparation in mathematics to qualify for admission to MATH 140 will ordinarily take the introductory physics courses PHYS 181, 182, 283 and 284, during their freshman and sophomore years. Those students who do not decide to major in astronomy or physics until after their freshman or sophomore year or enter as transfer students will often have taken other introductory courses in physics (i.e. PHYS 161, 262, 263). Students will find recommended course programs in the pamphlet entitled *Department Requirements for a B.S. degree in Astronomy* which is available from the As-

tronomy Program Office. This pamphlet outlines many different approaches for an astronomy major.

ASTR 180 (Descriptive and Analytical Astronomy) is the introductory astronomy course required of astronomy majors. It may be taken in the freshman or sophomore year. It is followed by another required course, ASTR 210 (Practical Astronomy). Some students may not decide to major in astronomy until they have already taken ASTR 100 and 105 (Introduction to Astronomy and Modern Astronomy). Such students should, as a rule, still fulfill the ASTR 180 requirement; only students with a grade of B or better in ASTR 100 and 105 will be encouraged to major in astronomy.

REQUIRED COURSES FOR ASTRONOMY MAJOR

(a) Introductory Physics Courses. PHYS 181, 182—Introductory Physics: Mechanics, Fluids, Heat and Sound (4,4) followed by PHYS 283—Introductory Physics: Electricity and Magnetism (4) and PHYS 284—Introductory Physics: Optics and Modern Physics (4) (Total 16 credits); or the above courses can be replaced by PHYS 161, 262, 263—General Physics (3,4,4) and PHYS 404—Intermediate Theoretical Mechanics (3) and PHYS 405—Intermediate Theoretical Electricity and Magnetism (3).

(b) Physics Laboratory. At least four credits of laboratory courses: ordinarily PHYS 285, 286, but 365, 485 may be added.

(c) Modern Physics, PHYS 421, 422 (3, 3) or Mathematical Physics, PHYS 410, 411 (4, 4).

(d) Supporting Courses. MATH 140, 141, 240—Analysis (4, 4, 4). MATH 246—Differential Equations (3) may be substituted for MATH 240.

(e) Introductory Astronomy Courses. Normally ASTR 180 and 210.

(f) Advanced Astronomy Courses. Two Astronomy courses at the 300-400 level. (Minimum 6 credits).

Students may major in Astronomy only if a grade of C or better is attained in each semester of the introductory physics and astronomy courses. Any student who wishes to be recommended for graduate work in astronomy must maintain a B average and should also consider including some or all of the following courses in his program in addition to those required of all astronomy majors:

(a) Astronomy. One or more additional courses at the 300-400 level.

(b) Physics. Both PHYS 410, 411 (4, 4)—Mathematical Physics and PHYS 421, 422 (3, 3)—Modern Physics; and one or more of those listed below.

(c) Supporting courses. Two or three additional mathematics or computer science courses, selected in consultation with the advisor.

Recommended courses are MATH 241—Calculus (4), MATH 246—Differential Equations for Scientists and Engineers (3), MATH 462, 463—Analysis for Scientists and Engineers (3, 3), MATH 413—Introduction to Complex Variables (4), MATH 410—Advanced Calculus (4), or MATH 460—Numerical Methods (3). (Minimum 15 credits).

Further physics courses that astronomy majors should consider, both those terminating at the B.S. and those planning graduate studies, are the following:

PHYS 365. ADVANCED EXPERIMENTS.

PHYS 412. KINETIC THEORY OF GASES.

PHYS 414. THERMODYNAMICS AND STATISTICAL MECHANICS.

PHYS 451. INTRODUCTION TO ELEMENTARY PARTICLES.

PHYS 463. INTRODUCTION TO PLASMA PHYSICS.

PHYS 465. MODERN OPTICS.

PHYS 471. INTRODUCTION TO ATMOSPHERIC AND SPACE PHYSICS.

PHYS 485. ELECTRONIC CIRCUITS.

A minimum of 120 credits is required for graduation.

HONORS IN ASTRONOMY

The Honors Program offers to students of exceptional ability and interest in astronomy an educational program with a number of special opportunities for learning. Honors sections are offered in several courses, and there are many opportunities for part-time research participation which may develop into full-time summer projects. An honors seminar is offered for advanced students; credit may be given for independent work or study; and certain graduate courses are open for credit toward the bachelor's degree.

Students for the Honors Program are accepted by the Department's Honors Committee on the basis of recommendations from their advisors and other faculty members. Most honors candidates submit a written report on their research project, which, together with an oral comprehensive examination in the senior year, concludes the program which may lead to graduation "with Honors (or High Honors) in Astronomy."

COURSES FOR NON-SCIENCE MAJORS

There are a variety of Astronomy courses offered for those who are interested in learning about the subject but do not wish to major in it. These courses do not require any background in mathematics or physics and are geared especially to the non-science major. ASTR 100 is a general survey course that briefly covers all of the major parts of Astronomy. ASTR 110 is the lab that can be taken with or after ASTR 100. ASTR 105 is at the same level as ASTR 100 except it covers a few topics in depth rather than many

briefly. ASTR 398 is offered to non-scientists who want to learn about a particular field in depth; the subject matter will change each semester and will cover topics like: the solar system, our Galaxy, the Universe, etc.

Course Code Prefix—ASTR

BIOLOGICAL SCIENCES PROGRAM

This program has been prepared for the student who is interested in biology but whose interest has not yet centered in any one of the biological sciences. It is suitable for the pre-dental or pre-medical student who plans to earn the B.S. degree before entering professional school. The program includes work in botany, entomology, microbiology, and zoology, and introduces the student to the general principles and methods of each of these biological sciences. The student may then emphasize one of these areas in completing his program.

By proper selection of courses during the junior and senior years, a student may concentrate his work sufficiently in one area of biology to be able to continue graduate work in that field. However, a student who is planning to do graduate work should major in one specific field of biology.

The student following this program must meet the general requirements for a degree. He should select French or German to meet the foreign language requirements.

Required introductory courses in the biological sciences: BOTN 100, ENTM 200, MICB 200, ZOOL 101. These courses must be passed with an average grade of at least C. The pre-professional student should take ZOOL 102 as well.

Required supporting courses in mathematics and physical sciences: MATH 110, 111; CHEM 103, 104; PHYS 121, 122. The student working in most areas of biology will also need the second year of Chemistry (CHEM 201-204; or 211-214). Additional work in chemistry may also be required by the student's advisor, in accordance with the needs of the student's field of emphasis. The pre-professional student must include CHEM 201-204 or 211-214 in his program.

Advanced courses in the biological sciences: The student must complete at least 30 semester hours of advanced work selected from the fields of botany, entomology, microbiology, and zoology. Of these credits at least 18 must be at the 300 and 400-level and be taken in at least two of the four departments. The following courses in psychology may be counted as part of the required 30 semester hours, but may not be used to satisfy the requirement of 18 semester hours at the advanced level: PSYC 402, 403, 410, 462, 479.

A junior or senior following this curriculum will be advised by the department in which he plans to do the most work.

BOTANY

Professor and Acting Chairman: Sisler.
Professors: Brown, Corbett, Galloway, Gauch, Kantzes, Krusberg, D. T. Morgan, Sisler, Stern and Weaver.
Research Professor: Sorokin.
Associate Professors: Bean, Curtis, Karlander, Klarman, Lockard, O. D. Morgan, Patterson and Rappleye.
Assistant Professors: Barnett, Harrison, Motta, Reveal, Smith, Stevenson and Van Valkenburg.
Faculty Research Assistant: Shearer.
Research Assistant: Orris.
Instructors: Grigg, Higgins and Owens.

The Department offers work in the major fields of physiology, pathology, ecology, taxonomy, anatomy-morphology, and genetics.

The required courses for the freshman and sophomore years are the same for all students. In the junior and senior years, the student elects botany courses to suit his particular interest. Courses are required in other subjects to contribute toward a broad cultural education, and to support the courses selected in the chosen field of botany.

The curriculum provides a complete survey of the field of botany, and lays a good foundation for graduate work in botany in preparation for teaching and for research in experiment stations or private research laboratories.

Students who wish to meet the requirements for certificates in secondary education may elect basic courses in education. An additional semester will usually be necessary to take certain courses in education, including the required practice teaching. As long as the demand continues, a series of advanced courses will be offered in rotation in the summer session especially for teachers working toward the degree of Master of Education in science teaching.

The Department of Botany has instituted an Honors Program which a student may enter if he desires and if he meets the requirements of the program.

The science requirement will be satisfied by completing the following courses:

BOTN 100—General Botany	4
CHEM 103, 104—College Chemistry I, II	4,4
ZOOL 101—General Zoology	4

DEPARTMENT OF BOTANY REQUIREMENTS	Semester Credit Hours
BOTN 202—General Botany	4
BOTN 212—Plant Taxonomy	3
BOTN 221—Diseases of Plants	4
BOTN 441—Plant Physiology	4
BOTN 462—Plant Ecology	2
BOTN 411—Plant Anatomy or	3
BOTN 416—Principles of Plant Anatomy	4
BOTN 414—General Plant Genetics	3
BOTN 398—Seminar	1 or 2
Modern Language, or A&S exemption	6-12
MATH 110, 111—Introduction to Mathematics or MATH 140, 141	6

MICB 200—General Microbiology	4
PHYS 121, 122—Fundamentals of Physics	8
Botany electives or related courses	12 or 15
Electives	12

BUSINESS ADMINISTRATION

(Under the Reorganization Plan for the College Park Campus, this Unit will become the College of Business and Management. Statements of Requirements and course offerings may be subject to change at that time.)

Professor and Chairman: Taff.
Professors: Anderson, Carroll, Dawson, Fisher, Hermanson, Hille, Lamone, Levine, Miner and Wright.
Associate Professors: Ashmen, Daiker, Edelson, Fromovitz, Gannon, Greer, Haslem, Hynes, Loeb, Locke, Nash, Olson, Paine, Spivey, Thieblot and Widhelm.
Assistant Professors: Anderson, Bedingfield, Corwin, Falthzik, Handorf, Hargrove, Himes, Holmberg, Hoshi, Jolson, Kuehl, Leete, Lynagh, May, Nickels, Poist, Solomon and Zabriskie.
Lecturers: Keaton, Neuman, Taylor and Treichel.
Instructors: Broden, Buckingham, Bulmash, Coyner, Dalton, Doilney, Edelman, Garner, Goldschmidt, Grazer, Kmetz, Levine, Lindsay, Lubell, Matthews, Mattingly, McConnell, O'Neill, Pasternack, Rice, Romig, Rymer, Sherwood, Shimp, Silberg, Stewart, Webb and Wolff.

Business organizations are set up primarily for the purpose of producing and distributing goods and services. Modern business administration requires a knowledge and understanding of organizational structures, operations and environments. The curricula of the Department of Business Administration emphasize the principles and problems involved in the development of organizations and in the formulation and implementation of their policies.

STUDY PROGRAMS IN THE DEPARTMENT

The programs of study in the Department of Business Administration are so arranged as to facilitate concentrations according to the major functions of business management. This plan is not, however, based on the view that these major divisions are independent units, but rather that each is closely related to and dependent on the others. Every student in business administration is required to complete satisfactorily a minimum number of required basic subjects in the arts, sciences and humanities as prerequisites to work in the major management fields.

A business administration honors program is open to business administration majors entering their junior year. Students must have an academic average of at least 3.0 to be eligible for admittance to this program.

FRESHMAN AND SOPHOMORE REQUIREMENTS

	Hours
ENGL 101, 201, 202 (or 171, 201, 202)	9
MATH 110, 111 and 220 or (140 and 141)	9(8)
SPCH 100	3
History	6
BSAD 110	3
BSAD 220A and 221A (220 and 221)*	6
ECON 201 and 203	6
BSAD 230 (231)**	3

*For Accounting majors.
**For Mgmt Sci STAT & STAT-IFSM majors.

Two science courses (one biological and one physical, and at least one of which must be a lab science) selected from the following:

Physical—Astronomy	3
Geology	3
Physics	3
Chemistry	4
Biological—Botany	4
Zoology	4
Entomology	4
Biology	4

A social science course (ECON 201 may be used for 3 hours of the 6 hour social science requirement) selected from the following:

GVPT 170 or 100	3
PSYC 100	3
SOCY 100	3
ANTH 101	3

A fine arts requirement of 3 hours of which the following are representative:

PHIL 100, 170, 140, 236	3
ARTH 100, 260, 261	3
MUSC 130	3
DART 110	3
Electives (chosen with approval of advisor)	2-5
HLTH 105 (men and women)	1 sem. (2 cr.)
P.E. (men and women)	2 semesters

Students who wish to elect a foreign language must take nine semester hours of the language or six hours at the intermediate level or higher, in order to obtain credit. Such students may use the free electives available to them for this purpose.

A TYPICAL PROGRAM FOR FIRST TWO YEARS

Freshman Year			
ENGL 101 (or 171)	3	ENGL 201	3
BSAD 110 or SPCH 100	3	SPCH 100 or BSAD 110	3
MATH 110 (or 140)	3(4)	MATH 111 (or 141)	3(4)
HLTH 105	(2)	HIST	3
Fine Arts, Social Science, or Science	3-4	Fine Arts, Social Science, or Science	3-4
P.E.	(1)	P.E.	(1)
	15-17		16-18

Sophomore Year			
ENGL 202	3	ECON 203	3
BSAD 220 (220A)	3	BSAD 221 (221A)	3
ECON 201	3	BSAD 230 (231)	3
MATH 220*	3	History	3
Fine Arts, Social Science, or Science	3-4	Fine Arts, Social Science, or Science	3-4
	15-16		15-16

*Select Elective, if MATH 140 and 141 sequence is chosen.

JUNIOR AND SENIOR REQUIREMENTS

BSAD 340—Business Finance	3
BSAD 350—Marketing Principles and Organization	3
BSAD 364—Management and Organization Theory	3
BSAD 380—Business Law	3
BSAD 495—Business Policies	3
Total	15

In addition to the above, two 300 or 400 level courses must be taken in economics, at least one of which must be: ECON 401, National Income Analysis; ECON 403, Intermediate Price Theory; ECON 430, Money and Banking; or ECON 440, International Economics. (Note: Finance Majors see Finance economics requirement.)

At least 45 hours of the 120 semester hours of academic work required for graduation must be in business administration subjects. In addition to the requirement of an overall average of C in academic subjects, *an average of C in business administration subjects is required* for graduation. Electives in the curricula of the department may, with the consent of the advisor, be taken in any department of the University if the student has the necessary prerequisites.

GENERAL CURRICULUM IN BUSINESS ADMINISTRATION

The General Curriculum in Business Administration is designed for those who desire a broad program in management. The curriculum contains a relatively large number of elective courses. Selection is subject to approval by an advisor and must contribute to a program of courses closely balanced between (1) a functional field, (2) the various basic areas of management and (3) non-business fields.

Students selecting this curriculum will take the basic courses required for all students in the Department of Business Administration. In addition, students will take:

(1) The following required courses:

	Semester Hours
BSAD 351—Marketing Management or BSAD 450 Marketing Research Methods	3
BSAD 360—Personnel Management I or BSAD 362 Labor Relations	3
BSAD 370—Principles of Transportation or BSAD 371—Traffic and Physical Distribution Management	3
BSAD 301—Electronic Data Processing or BSAD 332 Operations Research I or BSAD 385 Production Management	3
BSAD 482—Business and Government	3
	15

(2) three semester hours from the following:

BSAD 311—Intermediate Accounting
BSAD 431—Design of Statistical Experiments in Business
BSAD 440—Financial Management
BSAD 481—Public Utilities

3

Total 18

Thus, the upper division requirements are:

Junior-senior requirements for all departmental students	15
Junior-senior curriculum concentration	18
Electives in 300 or 400 level economics courses at least one of which must be ECON 401, 403, 430, or 440	6
Upper division electives to complete 120 s.h. required for graduation	21
Total junior-senior year requirements	60

ACCOUNTING

Accounting, in a limited sense, is the analysis, classification and recording of financial events and the reporting of the results of such events for an organization. In a broader sense, accounting consists of all financial devices for planning, controlling and appraising performance of an organization. In this broader sense, accounting includes among its many facets financial planning, budgeting, accounting systems, financial management controls, financial analysis of performance, financial reporting, internal and external auditing, and taxation of business.

The accounting curriculum provides an educational foundation for careers in accounting and a foundation for future advancement in other management areas whether in private business organizations, government agencies, or public accounting firms. Students who select this curriculum will complete the freshman and sophomore requirements for all students in the Department of Business Administration.

Course requirements for the junior and senior years are:

(1) The junior-senior requirements for all students in the Department of Business Administration,

(2) the following courses:

	Semester Hours
IFSM 401—Electronic Data Processing	3
BSAD 310, 311—Intermediate Accounting	6
BSAD 321—Cost Accounting	3
BSAD 323—Income Tax Accounting	3
and 9 semester hours from the following:	
BSAD 420, 421—Undergraduate Accounting Seminar	
BSAD 320—Accounting Systems	
BSAD 422—Auditing Theory and Practice	
BSAD 424—Advanced Accounting	
BSAD 425—CPA Problems	
BSAD 427—Advanced Auditing Theory and Practice	
BSAD 426—Advanced Cost Accounting	

Thus, the upper division requirements for accounting majors are:

Junior-senior requirements for all departmental students	15
Junior-senior accounting requirements (minimum)	21
IFSM 401—Electronic Data Processing	3
Electives in 300 or 400 level economics courses at least one of which must be ECON 401, 403, 430, or 440	6
Electives (to complete 120 semester hours required for graduation)	15
Total junior-senior year requirements	60

For graduates of the University of Maryland, the educational requirement of the Maryland State Board of Public Accountancy for taking the C.P.A. examination *without practical experience* totals thirty semester hours of accounting courses plus six semester hours of business law. Students wishing to satisfy the Board's requirements must include BSAD 422 in their undergraduate program. Students not wishing to satisfy the Board's requirements to sit for the C.P.A. examination without experience are eligible to take the examination after obtaining two years of practical experience satisfactory to the Board.

A student planning to take the C.P.A. examination in a state other than Maryland should determine the course requirements, if any, for such state and arrange his program accordingly.

FINANCE

The finance curriculum is designed to familiarize the student with the institutions, theory and practice involved in the allocation of financial resources within the private sector, especially the firm. It is also designed to incorporate foundation study in such related disciplines as economics and the quantitative areas.

The finance curriculum provides an educational foundation for careers involving financial analysis and management, investment analysis and portfolio management, investment banking, banking and international finance; it also provides a foundation for graduate study in business administration, quantitative areas, economics, and law.

Course requirements for the junior-senior curriculum concentration in finance are:

	Semester Hours
(1) The following required courses:	
IFSM 401 Electronic Data Processing	3
ECON 430 Money and Banking	3
BSAD 332 Operations Research for Management Decisions	3
BSAD 343 Investments	3
plus	
(2) Two of the following courses	
BSAD 440 Financial Management	
BSAD 443 Security Analysis and Valuation	
BSAD 445 Commercial Bank Management	
BSAD 481 Public Utilities	6
and	
(3) one of the following courses (check prerequisites):	
IFSM 402—Electronic Data Processing Applications	
BSAD 430—Linear Statistical Models in Business	
BSAD 431—Design of Statistical Experiments in Business	
BSAD 433—Statistical Decision Theory in Business	
MATH—Three semester hours of mathematics beyond the departmental requirement	3
Total	21

The upper division requirements are summarized as follows:

Junior-senior requirements for all departmental students	15
Junior-senior curriculum concentration	21
One course in economics selected from ECON 401, 403, 431, 450, 402, and 440	3
Electives to complete the 120 semester hours required for graduation	21
Total junior-senior year requirements	60

INSURANCE AND REAL ESTATE

Students interested in insurance or real estate may concentrate either in general business or finance and plan with their advisors a group of electives to meet their specialized needs. Courses offered in insurance and real estate include risk management, principles of risk and insurance, real estate principles, and urban land management.

MARKETING

Marketing involves the functions performed in getting goods and services from producers to users. Career opportunities exist in manufacturing, wholesaling and retailing and include sales administration, marketing research, advertising and merchandising.

Students preparing for work in marketing research are advised to elect additional courses in Management Science—Statistics.

In addition to the courses taken by all students in the Department of Business Administration, the marketing program consists of:

(1) The following required courses:	
BSAD 332—Operations Research for Management Decisions	3
BSAD 351—Marketing Management	3
BSAD 352—Advertising	3
BSAD 450—Marketing Research Methods	3
Total required	12
and	
(2) six semester hours from the following:	
IFSM 401—Electronic Data Processing	
BSAD 431—Design of Statistical Experiments in Business	

* Note that the economics requirements for the finance major are more restrictive than stated under JUNIOR AND SENIOR REQUIREMENTS.

BSAD 453—Industrial Marketing	
BSAD 353—Retail Management	
BSAD 451—Consumer Analysis	
BSAD 454—International Marketing	
BSAD 452—Promotion Management	
BSAD 371—Traffic and Physical Distribution Management	6
Total	18

Thus, the upper division requirements are:

Junior-senior requirements for all departmental students	15
Junior-senior curriculum concentration	18
Electives in 300 or 400 level economics courses at least one of which must be ECON 401, 403, 430, or 440	6
Electives to complete 120 semester hours required for graduation	21
Total, junior-senior year requirements	60

PERSONNEL AND LABOR RELATIONS

Personnel administration has to do with the direction of human effort. It is concerned with securing, maintaining and utilizing an effective working force. People professionally trained in personnel administration find career opportunities in business, in government, in educational institutions, and in charitable and other organizations.

(1) The required courses are:

BSAD 360—Personnel Management	3
BSAD 460—Personnel Management: Analysis & Problems	3
BSAD 464—Organizational Behavior	3
BSAD 362—Labor Relations	3
BSAD 462—Labor Legislation	3
Total required	15

and

(2) three hours from the following:

BSAD 467—Undergraduate Seminar in Personnel Management
BSAD 385—Production Management
PSYC 432—Personnel and Industrial Psychology
PSYC 351—Tests and Measurements
PSYC 352—Psychology of Individual Differences
SOCY 462—Industrial Sociology
SOCY 447—Small Group Analysis
GVPT 411—Public Personnel Administration
JOUR 330—Public Relations 3

Total 18

Thus, the upper division requirements are:

Junior-senior requirements for all departmental students	15
Junior-senior curriculum concentration	18
Electives in 300 or 400 level economics courses at least one of which must be ECON 401, 403, 430, or 440	6
Electives to complete 120 semester hours required for graduation	21
Total, junior-senior year requirements	60

PRODUCTION MANAGEMENT

This curriculum is designed to acquaint the student with the problems of organization and control in the field of production management. Theory and practice with reference to organization, policies, methods, processes and techniques are surveyed, analyzed and evaluated.

The courses in addition to those required of all students in the Department of Business Administration are:

	Semester Hours
(1) The following required courses:	
BSAD 321—Cost Accounting	3
BSAD 360—Personnel Management	3
BSAD 385—Production Management	3
BSAD 485—Advanced Production Management	3
Total required	12

and

(2) six hours from the following:

BSAD 433—Statistical Decision Theory in Business
BSAD 353—Industrial Marketing
BSAD 362—Labor Relations
BSAD 332—Operations Research for Management Decisions
BSAD 371—Traffic and Physical Distribution Management 6

Total 18

Thus, the upper division requirements are:

Junior-senior requirements for all departmental students	15
Junior-senior curriculum concentration	18
Electives in 300 or 400 level economics courses at least one of which must be ECON 401, 403, 430, or 440	6
Electives to complete 120 semester hours required for graduation	21
Total junior-senior year requirements	60

MANAGEMENT SCIENCE—STATISTICS

In the management—statistics curriculum, the student will have the option of concentrating primarily in statistics or primarily in management science. The two options are described below.

THE STATISTICS OPTION

Statistics consists of a body of methods for utilizing probability theory in decision-making processes. Important statistical activities ancillary to the decision-making process are the systematization of quantitative data and the measurement of variability. Some specialized areas within the field of statistics are: sample surveys, forecasting, quality control, design of experiments, Bayesian decision processes, actuarial statistics, and data processing. Statistical methods—for example, sample survey techniques—are widely used in accounting, marketing, industrial management, and government applications.

An aptitude for applied mathematics and a desire to understand and apply scientific methods to significant problems are important prerequisites for the would-be statistician.

Students planning to major in statistics must take MATH 140-141.

Students selecting this curriculum will take, in addition to the courses required for all students in the Department of Business Administration:

(1) The following required courses:

	Semester Hours
BSAD 430—Linear Statistical Models in Business	3
BSAD 434—Operations Research I	3
BSAD 432—Sample Surveys in Business and Economics	3
BSAD 438—Topics in Statistical Analysis For Business and Management	3

and

(2) six semester hours from the following:

IFSM 401—Electronic Data Processing
BSAD 450—Marketing Research Methods
BSAD 433—Statistical Decision Theory in Business
BSAD 435—Operations Research II
BSAD 436—Applications of Mathematical Programming in Management Science
STAT 400—Probability and Statistics I 6

Totals 18

THE MANAGEMENT SCIENCE OPTION

Management Science—Operations Research can be defined as the application of scientific methodology by interdisciplinary teams to problems involving the control of organized man-machine systems so as to provide solutions which best serve the purposes of the organization as a whole.

Practitioners in this field are employed by large organizations (military, governmental, private industrial, private consulting) to analyze operations in the light of organizational goals and recommend changes requisite to goal fulfillment.

Students planning to major in this field must complete MATH 140-141 prior to junior standing. Students considering graduate work in this field should complete MATH 240-241 as early as possible in their careers. Note MATH 240-241 may be counted as upper division elective credit.

Students electing this curriculum will take, in addition to the courses required for all students in the Department of Business Administration:

(1) The following required courses:

BSAD 430—Linear Statistical Models in Business	3
BSAD 434—Operations Research I	3
BSAD 435—Operations Research II	3
BSAD 436—Applications of Mathematical Programming in Management Science	3
Total	12

and

(2) Six semester hours from the following:

BSAD 430—Sample Surveys in Business and Economics	
BSAD 432—Statistical Decision Theory in Business	
BSAD 438—Topics in Statistical Analysis For Business and Management	
STAT 400—Applied Probability & Statistics I	
IFSM 401—Electronic Data Processing	
IFSM 410—Information Processing Problems of Administrative, Economic, and Political Systems	
IFSM 436—Introduction To System Analysis	
BSAD 385—Production Management	
BSAD 485—Advanced Production Management	6
Total	18

Thus, the upper division requirements are for both options:

Junior-senior requirements for all departmental students	15
Junior-senior curriculum concentration	18
Electives in 300 or 400 level economics courses at least one of which must be ECON 401, 403, 430, or 440	6
Electives to complete 120 s.h. required for graduation	21
Total junior-senior requirement	60

TRANSPORTATION

Transportation involves the movement of persons and goods in the satisfaction of human needs. The curriculum in transportation includes an analysis of the services and management problems, such as pricing, financing, and organization, of the five modes of transport—air, motor, pipelines, railroads, and water—and covers the scope and regulation of transportation in our economy. The effective management of transportation involves a study of the components of physical distribution and the interaction of procurement, the level and control of inventories, warehousing, material handling, transportation, and data processing.

The curriculum in transportation is designed to prepare students to assume responsible positions with carriers, governmental agencies, and traffic and physical distribution management in industry.

Course requirements are, in addition to the junior-senior requirements for all students in the Department of Business Administration:

(1) The following required courses:

BSAD 332—Operations Research for Management Decisions	3
BSAD 370—Principles of Transportation	3
BSAD 371—Traffic and Physical Distribution Management	3
BSAD 470—Motor Transportation	3
BSAD 473—Advanced Transportation Problems	3
Total	15

and

(2) Three semester hours to be selected from the following:

BSAD 471—Water Transportation	
BSAD 472—Commercial Air Transportation	
BSAD 474—Urban Transport and Urban Development	
BSAD 481—Public Utilities	
BSAD 392—Introduction to International Business Management	3
Total required	18

Thus, the upper division requirements are:

Junior-senior requirements for all departmental students	15
Junior-senior curriculum concentration	18
Electives in 300 or 400 level economics courses at least one of which must be ECON 401, 403, 430 or 440	6
Electives to complete 120 s.h. required for graduation	21
Total junior-senior year requirements	60

COMBINED BUSINESS ADMINISTRATION AND LAW PROGRAM

The Department of Business Administration offers a combined Business Administration-Law Curriculum in which the student completes three years in the General Curriculum in Business Administration in the department and a fourth year of work in the Law School of the University of Maryland. Admission to the Law School is contingent upon meeting the applicable standards of that school. Individual students are responsible to secure from the Law School its current admission requirements. The student must complete all the courses required of students in the department, the courses normally required for the general curriculum in Business Administration through the junior year, and enough credits to equal a minimum of 90 semester hours. No business law course can be included in the 90 hours. The last year of college work before entering the Law School must be completed in residence at College

Park. At least 30 hours of work must be in courses numbered 300 or above.

The Bachelor of Science degree is conferred upon students who complete the first year in the Law School with an average grade of C or better.

Course Code Prefix—BSAD

BUSINESS AND ECONOMIC RESEARCH

The functions of the Bureau of Business and Economic Research are research, education and public service.

The research activities of the bureau are primarily focused on basic research in the field of regional, urban and environmental studies. Although the Bureau's long-run research program is carried out largely by its own staff, faculty members from other departments also participate. The bureau also undertakes cooperative research programs with the sponsorship of federal and state governmental agencies, research foundations and other groups.

The educational functions of the bureau are achieved through active participation by advanced graduate and undergraduate students in the bureau's research program. This direct involvement of students in the research process under faculty supervision assists students in their degree programs and provides research skills that equip students for responsible posts in business, government and higher education.

The bureau observes its service responsibilities to government, business, and private groups primarily through the publication and distribution of its research findings. In addition, the bureau staff welcomes the opportunity to be of service to governmental, business and private groups by consulting with them on problems in business and economics, particularly those related to regional development.

CHEMICAL ENGINEERING

Professor and Department Chairman: Marchello.

Professors: Arsenault,** Beckmann, Duffey, Gomezplata, Johnson,* Schroeder, Silverman,* Smith and Skolnick.**

Associate Professors: Almenas,* Bolsaitis,** Cadman, Gentry, Munno,* Regan, Roush,*** and Spain.**

Assistant Professors: Blair,* Hatch, Kugelman, Sheaks,* and Spivak.****

Part-Time Professors: Goldman,* and Hoffman.

Lecturers: Belcher,* Dedrick and Paauwe.

Chemical engineering involves the application of sound engineering and economic principles—and basic sciences of mathematics, physics and chemistry—to process industries concerned with the chemical transformation of matter. The chemical engineer is primarily concerned with research and process development leading to new chemical process ventures or a better understanding of existing ones; with the efficient operation of the complete chemical plants or its component units; with the technical services engineering required for improving and understanding chemical plant operation and the products produced; with the chemical sales and economic distribution of the chemical plant product; and with the general management and executive direction of chemical process industry plants and industrial complexes.

Because of this wide range of ultimate application, the chemical engineer finds interesting and diverse career opportunities in such varied fields as chemical (inorganic and organic), food processing and manufacture, metallurgical, nuclear and energy conversion, petroleum (refining, production, or petrochemical), and pharmaceutical industries. Additional opportunities are presented by the research and development activities of many public and private research institutes and allied agencies.

The Chemical Engineering Department offers a curriculum to prepare the undergraduate for a challenging career in any of the aforementioned fields of interest—a curriculum that will prepare him for continued graduate study or immediate industrial employment following the baccalaureate degree.

The program is developed around three areas: chemical, materials and nuclear engineering. In addition, the development of programs in applied polymer science, and biological and environmental health engineering has been initiated. These new programs are interdisciplinary with other departments of the University.

BASIC FRESHMAN YEAR

Course No. and Title	Semester I	Semester II
HLTH 105—Science and Theory of Health	(2)	..
CHEM 103, 104—General Chemistry** ..	4	4
PHYS 161—General Physics	..	3
MATH 140, 141—Analysis I, II	4	4
ENES 101—Intro Engr. Science	3	..
ENES 110—Mechanics	..	3
General Education Courses	3	3
Physical Activities	(1)	(1)
Total Credits	17	18

**Quelified students may elect to take CHEM 105 and 106 (4 cr. hrs. each) instead of CHEM 103 and 104.

Students who are not prepared to schedule MATH 140 are advised to schedule MATH 115 (3 cr.) and ENGL 101 (3 cr.) in the Summer Session before the fall (first) Semester. MATH 115 does not count toward fulfilling the requirements of an engineering degree . . . . . it is a preparatory course. Otherwise, students will schedule their freshman year as showing in the following:

* Member of Nuclear Engineering Faculty group.
** Member of Engineering Matarials Faculty group.
*** Joint Appointment with Physics.
**** Joint Appointment with Textiles.

ALTERNATE FRESHMAN YEAR

Course No. and Title	Semester I	II	Summer
HLTH 105—Science and Theory of Health	(2)		
CHEM 103, 104—General Chemistry**	4	4	
PHYS 161—General Physics I			3
MATH 115—Intro. to Analysis***	3		
MATH 140, 141—Analysis I, II		4	4
ENES 101—Intro. Engr. Science	3		
ENES 110—Mechanics		3	
General Education Courses	3	6	
Physical Activities	(1)	(1)	
Total Credits	16	18	7

**Qualified students may elect to take CHEM 105 and 106 (4 cr. hrs. each) instead of CHEM 103 and 104

***MATH 115 is an additional course for those students who do not qualify to begin with MATH 140.

SOPHOMORE YEAR	Semester I	II
General Education Course		3
MATH 240—Linear Algebra	4	
MATH 246—Differential Equations		3
PHYS 262, 263—General Physics	4	4
ENES 220—Mechanics of Materials	3	
CHEM 201, 203—College Chemistry III, IV	3	3
CHEM 204—College Chemistry Laboratory IV		2
ENCH 215—Chemical Engineering Analysis I	3	
ENCH 250—Chemical Engineering Analysis II		2
Total	17	17

JUNIOR YEAR	Semester I	II
General Education Courses	3	3
ENCH 440—Chemical Engr. Kinetics	..	3
ENCH 442—Chemical Engineering Systems Analysis and Dynamics	..	2
ENCH 443—Dynamics and Control Lab.	..	1
CHEM 481, 482—Physical Chemistry	3	3
CHEM 430—Chemical Measurements Laboratory I	3	..
Technical Elective	..	2
ENCH 295—Chemical Process Thermo	3	..
ENCH 425, 427—Transfer and Transport Processes I, II	4	3
Total	16	17

SENIOR YEAR		
General Education Courses	6	3
ENEE Electives	3	..
ENCH 333—Seminar	..	1
ENCH 437—Chemical Engneering Lab.	3	..
ENCH 445—Process Engr. and Design	..	3
ENCH 447—Chem. Engineering Econ.	..	2
Technical Electives*	4	7
Total	16	16

Course Code Prefix—ENCH
*At least nine credits of technical electives must be taken at the 300 level.

CHEMISTRY

Professor and Chairman: Vanderslice.
Professor and Associate Chairman: Jaquith.
Professors: Castellan, deZeeuw, Gardner, Goldsby, Gordon, Grim, Henery-Logan, Holmlund, Keeney, Lippincott, Pickard, Ponnamperuma, Pratt, Purdy, Reeve, Rollinson, Stewart, C. F. Stuntz, Svirbely (Emeritus), Veitch, White (Emeritus).
Visiting Professors: Breger, Reiman, Rose.
Research Professor: Bailey.
Associate Professors: Ammon, Bellama, Boyd, Davis, DeVoe, Huheey, Jarvis, Kasler, Khanna, Lakshmanan, Martin, Mazzocchi, Miller, O'Haver, Sampugna, Staley, Viola, Walters.
Assistant Professors: Campagnoni, Hanson, Helz, Moore, Murphy, Olin, Sommer, Zoller.
Instructors: Gamble, Ingangi, S. M. Stuntz.
Lecturer: Heikkinen.

The curriculum in chemistry is centered around a basic core of 30 credits (18 lower-division and 12 upper-division) in chemistry. An additional two credits must be chosen from among other upper-division courses in chemistry. The program is designed to provide the maximum amount of flexibility to students seeking preparation for either the traditional branches of chemistry or to interdisciplinary fields. Students wishing a degree program specifically certified by the American Chemical Society must elect more than the minimum number of elective credits in chemistry, and must choose judiciously among the upper-division courses offered. In addition, the ACS-certified degree program presently requires the use of German or Russian to satisfy College of Arts and Sciences language requirements. Students not desiring to follow an ACS-certified program may choose other languages for this purpose.

A sample program, listing only the required or recommended courses, is given below. It is expected that each semester's electives will include courses intended to satisfy the general requirements of the University or of the College of Arts and Sciences, plus others of the student's choice.

FIRST YEAR

Chem 103 or 105	4	Chem 104 or 106	4
Math 140*	4	Math 141*	4
Electives	7	Electives	7
	15		15

*Students initially placed in MATH 115 will delay MATH 140 and 141 one semester.

SECOND YEAR

Chem 201 or 211	3	Chem 203 or 213	3
Chem 202 or 212	2	Chem 204 or 214	2
Physics 141	4	Physics 142	4
Electives	6	Electives	6
	15		15

THIRD YEAR

Chem 430	3	Chem 431	3
Chem 481	3	Chem 482	3
Electives	9	Electives	9
	15		15

FOURTH YEAR

Electives	15	Electives	15

For American Chemical Society certification the electives must include CHEM 401, 421, and

443, plus two of the following: 398 or 399, 433, 441, 461, 473, 474 or 485. An advanced course in mathematics or physics that has a prerequisite of MATH 141 may be substituted for one of these courses.

BIOCHEMISTRY

The Chemistry Department also offers a major in biochemistry. The program requires one of the lower-division chemistry sequences; Chemistry 461 and 462; Chemistry 481 and 482; Chemistry 430 and 464; and nine credits of approved biological science that must include at least one upper-division course. A sample program, listing only the required courses, is given below. It is expected that each semester's electives will include courses intended to satisfy the general requirements of the University or of the College of Arts and Sciences, plus others of the student's choice.

FIRST YEAR

Chem 103 or 105	4	Chem 104 or 106	4
Math 140*	4	Math 141	4
Electives**	7	Electives	7
	15		15

*Students initially placed in MATH 115 will delay MATH 140 and 141 one semester.
**It is suggested that the first year electives include at least one course in biological science.

SECOND YEAR

Chem 201 or 211	3	Chem 203 or 213	3
Chem 202 or 212	2	Chem. 204 or 214	2
Physics 141	4	Physics 142	4
Electives	6	Electives	6
	15		15

THIRD YEAR

Chem 481	3	Chem 482	3
Chem 430	3	Chem 464	2
Chem 461	3	Chem 462	3
Electives	6	Electives	7
	15		15

FOURTH YEAR

Electives	15	Electives	15

The Chemistry Department's Honors Program begins in the junior year. Interested students should see the Departmental Honors Committee for further information.

AGRICULTURAL CHEMISTRY

This curriculum insures adequate instruction in the fundamentals of both the physical and biological sciences. It may be adjusted through the selection of electives to fit the student for work in agricultural experiment stations, soil bureaus, geological surveys, food laboratories, fertilizer industries, and those handling food products.

The science requirement will be satisfied by completing 16 credit hours from the following courses:

	Semester Credit Hours
BOTN 100—General Botany	4
MICB 200—General Microbiology	4
ZOOL 101—General Zoology	4
and	
CHEM 103,104—College Chemistry I, II	4,4

REQUIRED OF ALL STUDENTS:

CHEM 203—College Chemistry IV	3
CHEM 204—College Chemistry IV Laboratory	2
CHEM 201—College Chemistry III	3
CHEM 202—College Chemistry III Laboratory	2
CHEM 421—Advanced Quantitative Analysis or	3
CHEM 321—Quantitative Analysis	4
AGRO 202—General Soils	4
GEOL 100—Geology	3
MATH 141—Analysis II	4
Modern Languages	12
PHYS 141—Principles of Physics	4
PHYS 142—Principles of Physics	4
Electives in Biology	6
Electives in Agricultural Chemistry	6

Course Code Prefix—CHEM

CHILD STUDY, INSTITUTE FOR

Faculty: Edward Ansello, Stanley Bennett, B. Lucile Bowie, John Chapin, Marie Davidson, Laura Dittmann, John Eliot, Charles Flatter, Albert Gardner, Jacob Goering, Harry Green, Robert Hardy, Agnes Hatfield, Robert Huebner, E. Joan Huntt, John Kurtz, David G. Kyle, Howard Long, Richard Matteson, Garry McDaniels, Madelaine Mershon, Frank Millhollan, H. Gerthon Morgan, Hugh Perkins, Saul Rogolsky, John Shiflett, Bonnie Tyler, Stephen Wolk.

The Institute for Child Study carries on the following activities: (1) It undertakes basic research in human development; (2) It synthesizes research findings from many sciences that study human beings; (3) It plans, organizes and provides consultant service programs of direct child study by in-service teachers in individual schools or in municipal, county or state systems; (4) It offers course programs and field training to qualified graduate students, preparing them to render expert consultant service to schools and for college teaching of human development.

Undergraduate courses and workshops are designed for prospective teachers, in-service teachers and other persons interested in human development. Certain prerequisities are set up within the course sequences, but these prerequisites are modified by the student's previous experience in direct study of children.

Course Code Prefix—EDHD

CHINESE PROGRAM

Assistant Professor and Chairman: Chin.
Lecturer: Loh.
Instructors: Chen and Wang.

The Program offers two series of courses, the language series and the content series. The lan-

guage series consists of four levels of instruction. These are the elementary, the intermediate, the advanced, and a level of specialized courses such as Readings from Chinese History, Classical Chinese, etc. In addition, there is a course entitled Review of Elementary Chinese to bridge the gap between Elementary and Intermediate Chinese for those students who have had some exposure to the language but who are not ready for Intermediate Chinese.

The content series contains courses in Chinese civilization, literature, and linguistics. They do not presuppose previous training in the Chinese language except for Chinese Linguistics which is a course dealing with the sounds and grammatical systems of the Chinese language and its comparison with English. Since the illustrative materials in this course are in Chinese, the completion of Intensive Elementary Chinese or its equivalent is required.

The elementary Chinese course is intensified, meeting 8 hours a per week, for which students receive 12 credits in one year (6 per semester). The intensive program is designed to give students a solid foundation of the language in all four skills of speaking, hearing, reading, and writing (characters). The instructional approach is audio-lingual and communication-oriented.

Presently the Program offers a minor in Chinese. It consists of 18 credit hours of which 6 must be in Chinese Linguistics.

CIVIL ENGINEERING

Professor and Department Chairman: Ragan.
Professors: Carter, Lepper, Otts.
Associate Professors: Birkner, Cookson, Cournyn, Garber, Heins, Israel, Piper, Sternberg and Wedding.
Assistant Professors: Albrecht, Colville, Haefner, Hall, Harris, McCuen and Witzcak.

CIVIL ENGINEERING CURRICULUM

Civil engineering is concerned with the planning, design, construction and operation of large facilities associated with man's environment. Civil engineers specialize in such areas as environmental engineering, transportation systems, structures, water resource development, water supply and pollution control, urban and regional planning, construction management, and air pollution control. Many civil engineers enter private practice as a consulting engineer or start their own business in the construction industry. Others pursue careers with local, state, and federal agencies or with large corporations.

The undergraduate program is founded on the basic sciences and emphasizes the development of a high degree of technical competence. The program orients the student toward computer aided design techniques and prepares him to incorporate new concepts that will develop during his professional career. Further, the program stresses the balance between technical efficiency and the needs of society. The graduate is prepared to enter one of the areas mentioned above, or he can move into new areas specialization such as oceanographic engineering or the development of facilities for extra-terrestrial environments.

At no time has man been more concerned with the quality of his environment. Man is concerned with broad environmental problems such as pollution and the operation of his transportation systems. Man is also concerned with problems such as a need for new approaches in the design and construction of buildings. The civil engineering profession faces the greatest challenge in its history as it assumes a central role in the solution of the physical problems facting the urban-regional complex.

BASIC FRESHMAN YEAR

Course No. and Title	Semester I	Semester II
HLTH 105—Science and Theory of Health	(2)	..
CHEM 103, 104—General Chemistry**	4	4
PHYS 161—General Physics	..	3
MATH 140, 141—Analysis I, II	4	4
ENES 101—Intro Engr. Science	3	..
ENES 110—Mechanics	..	3
General Education Courses	3	3
Physical Activities	(1)	(1)
Total Credits	17	18

Students who are not prepared to schedule MATH 140 are advised to schedule MATH 115 (3 cr.) and ENGL 101 (3 cr.) in the Summer Session before the Fall (first) Semester. MATH 115 does not count toward fulfilling the requirements of an engineering degree . . . . . it is a preparatory course. Otherwise, students will schedule their freshman year as showing in the following:

ALTERNATE FRESHMAN YEAR

Course No. and Title	I	II	Summer
HLTH 105—Science and Theory of Health	(2)		
CHEM 103, 104—General Chemistry **	4	4	
PHYS 161—General Physics I			3
MATH 115—Intro to Analysis ***	3		
MATH 140, 141—Analysis I, II		4	4
ENES 101—Intro. Engr. Science	3		
ENES 110—Mechanics		3	
General Education Courses	3	6	
Physical Activities	(1)	(1)	
Total Credits	16	18	7

**Qualified students may elect to take CHEM 105 and 106 (4 cr. hrs. each) instead of CHEM 103 and 104.
***MATH 115 is an additional course for those students who do not qualify to begin with MATH 140.

SOPHOMORE YEAR	I	II
General Education Courses	3	3
MATH 240—Linear Algebra	4	
MATH 241—Analysis III		4
PHYS 262, 263—General Physics	4	4
ENES 220—Mechanics of Materials	3	
ENES 221—Dynamics		3
ENCE 221—Introduction to Environmetnal Engineering	3	
ENCE 280—Engineering Survey Measurements		3
Total	17	17

JUNIOR YEAR	Semester I	Semester II
General Education Course	..	3
ECON 205—Fundamentals of Economics	3	..
ENCE 360—Numerical Analysis and Computer Programming	..	3
ENCE 381—Applied Math. in Engr.	3	..
ENME 215—Principles of Mech. Engr.	..	3
ENCE 350—Fundamentals of Structural Analysis	3	..
ENCE 351—Basic Structural Design	..	3
ENCE 330—Basic Fluid Mechanics	3	..
ENCE 300—Fundamentals of Engineering Materials	3	..
ENCE 340—Basic Soil Mechanics	..	3
ENCE 370—Fundamentals of Transportation Engineering	3	..
Technical Elective (See Note B) *	..	3
Total	18	18
SENIOR YEAR		
General Education Courses	3	3
ENCE 460—Computer Analysis	3	..
ENCE 420, 421—Basic Civil Engineering Planning	2	1
Technical Electives (See Note B)	6*	6*
Extra-Departmental Electives (See Note A)	3	3
ENEE 300—Fundamentals of Elec. Engr.	..	3
Total	17	16

*These numbers represent five three-semester-credit courses. Additional semester credits will be involved to the extent that courses carrying more than three credits are selected.

NOTES CONCERNING ELECTIVES:

The student shall, with the assistance of his advisor, select a coherent program of electives in accordance with the following:

A. Six (6) elective credits (two courses) must be taken outside the Department of Civil Engineering. Three credits must be in a field related to economics, management or business law. The other three are at the choice of the student.

B. Five technical elective courses (15-18 credits) must be taken as specified below:

(1) A two-course sequence must be taken from one of the following:
   (a) ENCE 410, 411, 412
   (b) ENCE 430, 431, 432
   (c) ENCE 433, 434, 435
   (d) ENCE 440, 441, 400
   (e) ENCE 450, 451
   (f) ENCE 461, 462
   (g) ENCE 470, 471, 472

(2) Three courses may be selected from any 400 level electives offered by the Department. With departmental approval, one of the three may be a suitable technical elective outside the Department.

Course Code Prefix—ENCE

CLASSICAL LANGUAGES AND LITERATURES

Professor and Chairman: Avery.
Associate Professor: Hubbe.
Lecturer: Iverson.
Instructor: Clapper.

Major in Latin: LATN 101, 102, 203 and 204 or their equivalent must have been completed before a student may begin work on a major. A major consists of a minimum of twenty-four hours beginning with LATN 305, twelve hours of which must be taken in 400-level courses. In addition, a student majoring in Latin will be required to take as supporting courses LATN 170, HIFN 456, and HIFN 410. He is urged to pursue a strong supporting program in Greek. The following courses are recommended as electives: HIST 251 and 252, ARTH 402 and 403, and PHIL 310. No course in the Latin language with a grade less than C may be used to satisfy major requirements.

Normally no placement tests are given in the classical languages. The following schedule will apply in general in determining the course level at which students will register for Latin.

Students offering 0 or 1 unit of Latin will register for LATN 101.

Students offering 2 units of Latin will register for LATN 203.

Students offering 3 units of Latin will register for LATN 204.

Students offering 4 units of Latin will register for LATN 305.

However, those presenting 2, 3 or 4 units of preparatory work may register initially for the next higher course by demonstrating proficiency through a placement test. Students whose stage of achievement is not represented here are urgently invited to confer with the chairman of the department. Students who wish to continue the study of Greek should likewise confer with the chairman of the department. No credit will be given for less than two semesters of elementary Latin or Greek except as provided in the course descriptions of LATN and GREK 101.

Course Code Prefixes—LATN, GREK

COMPARATIVE LITERATURE PROGRAM

Advisory Committee on Comparative Literature

Freedman, G. Jones, R. T. Swigger, W. MacBain, C. Hering, and G. Nemes.

Professors: Goodwyn, Jones.

Associate Professors: Berry, Greenwood, Perloff, Salamanca, Smith, and Walt.

Assistant Professors: Swigger, Gilbert, and Salchenberger.

Undergraduates may emphasize comparative literature as they work toward a degree in one of the departments of literature. Each student will be formally advised by the faculty of his "home" department. In general, every student will be required to take CMLT 401 and CMLT 402, and, during his last year, CMLT 496. The various literature

departments concerned will have additional specific requirements.

Students emphasizing comparative literature are expected to develop a high degree of competence in at least one foreign language.

Course work may not be limited to the nineteenth and twentieth centuries.

LATN 170 is highly recommended.

Course Code Prefix—CMLT

COMPUTER SCIENCE PROGRAM

Professor and Director of Computer Science Center: Atchison.

Professors: Chu,[1] Edmundson,[2] Glasser,[3] Heilprin,[4] Kanal, Minker.

Research Professors: Ortega,[2, 5] Rheinboldt,[2] Rosenfeld.

Associate Professors: Austing, Fix,[5] Vandergraft.

Assistant Professors: Agrawala, Basili, Deutsch, Feldman, Hagerty, Hamlet, McClellan, Mills, Noonan, Zelkowitz.

Instructor and Associate Director of Computer Science Center: Menard.

Instructors: Doyle, Milgram, Nagel, VanderBrug.

Lecturer: Lay.

The education program in computer science offers the Master of Science and Doctor of Philosophy degrees in computer science. It includes undergraduate as well as graduate courses for students in any academic program. Basic undergraduate courses are designed to offer students in all fields an introduction to the use of computers. Advanced undergraduate courses offer suitable preparation for graduate study in computer science or supporting work for students majoring in other areas.

A Bachelor of Science degree program is being developed. Information about its availability may be obtained from the Education Office of the Computer Science Center.

Computing service for all academic activities of the University is provided by the Computer Science Center which also conducts an active research program in computer and computer-related sciences. Computing equipment includes a Univac 1108 system with numerous remote units.

CONSERVATION AND RESOURCE DEVELOPMENT PROGRAMS

The development and use of natural resources (including water, soil, minerals, fresh water and marine organisms, wildlife, air and human resources), are essential to the full growth of an economy.

The curriculum in Conservation and Resource Development is designed to instill concepts of the efficient development and judicious management of natural resources. The study of the problems associated with use of natural resources will acquaint students with their role in economic development while maintaining concern for the quality of the environment.

Students will prepare for professional and administrative positions in land and water conservation projects, for careers in operational, administrative, educational, and research work in land use, fish and wildlife management, natural resource management, recreational area development, and management, or for graduate study in any of the several areas within the biological sciences.

Students will pursue a broad education program and then elect subjects concentrated in a specific area of interest. A student will be assigned an advisor according to his area of interest.

Students will be encouraged to obtain summer positions which will give them technical laboratory or field experience in their chosen interest area.

The science requirement will be satisifed by completing the following courses:

	Semester Credit Hours
CHEM 103,104—College Chemistry I, II	4,4
BOTN 100—General Botany	4
ZOOL 101—General Zoology	4

CONSERVATION AND RESOURCE DEVELOPMENT

AGRI 301—Introductory Agricultural Biometrics or AGRI 401—Agricultural Biometrics	3
AGEN 100—Introductory Agricultural Engineering	3
AGRO 202—General Soils	4
BOTN 211—Principles of Conservation	3
ENTM 200—Introductory Entomology	3
GEOG 201—General Geography or GEOL 100—Geology	3
MATH 110,111—Introduction to Mathematics (or MATH 115,140)	3,3
MICB 200—General Microbiology	4

ADDITIONAL REQUIREMENTS—One of the following options must be fulfilled:

PLANT RESOURCE MANAGEMENT

AGRO 100—Crop Production Laboratory	2
BOTN 202—General Botany	4
BOTN 212—Plant Taxonomy	3
BOTN 221—Diseases of Plants	4
BOTN 462—Plant Ecology	2
BOTN 464—Plant Ecology Laboratory	1
HORT 171—Elements of Forestry	3
Botany, Agronomy or related electives	6
Electives	22

FISH AND WILDLIFE MANAGEMENT

ANSC 416—Wildlife Management	3
BOTN 202—General Botany	4
ZOOL 102—Animal Phyla	4
ZOOL 470—Animal Ecology	3
PHYS 121,122—Fundamentals of Physics or MATH 220,221—Elementary Calculus	4,4
or 1 semester of each	4,4
Zoology or equivalent electives	7
Electives	18

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[1] Joint appointment with Electrical Engineering.
[2] Joint appointment with Mathematics.
[3] Joint appointment with Physics and Astronomy.
[4] Joint appointment with Library and Information Services.
[5] Joint appointment with the Institute for Fluid Dynamics and Applied Mathematics.

Course Code Prefix—CMSC

RESOURCE MANAGEMENT

AREC 240—Environment and Human Ecology	3
AREC 452—Economics of Resource Development	3
AREC 250, ECON 205—Elements of Agricultural Economics and Fundamentals of Economics or	
ECON 201,203—Principles of Economics I, II	3,3
GEOG 203—Introductory Economic Geography	3
ECOLOGY (BOTN or ZOOL)	3
Electives—in a specialized field	9
(Economics, Government and Politics, Community Development, Landscape Planning, Geography as approved by advisor.)	
Electives	20

WATER RESOURCE MANAGEMENT

AGEN 432—General Hydrology	3
AGEN 435—Aquacultural Engineering	3
AGRO 413—Soil and Water Conservation	3
AGRO 417—Soil Physics	3
AGRO 423—Soil-Water Pollution	3
GEOG 445—Climatology	3
GEOG 462—Water Resources and Water Resource Planning	3
Ecology (BOTN or ZOOL)	3
Electives	23

PEST MANAGEMENT

AGRO 100—Crop Production Laboratory	2
AGRO 423—Soil-Water Pollution	3
AGRO 453—Weed Control	3
BOTN 202—General Botany	4
BOTN 221—Diseases of Plants	4
ENTM 452—Insecticides	2
ENTM 451—Economic Entomology	4
ZOOL 102—Animal Phyla	4
Electives	21

COUNSELING AND PERSONNEL SERVICES

Faculty: Thomas Allan, Janice M. Birk, Richard H. Byrne, Nancy Carlson, Selina S. Chasnoff, Margaret A. Colby, Julia Davidson, Timothy Elsmore, Robert Freeman, Kenneth R. Greenberg, Larney Gump, John L. Haugen, Kenneth B. Hoyt, Eric Kafka, Wallace Kahn, George W. Kreiger, Richard Lawrence, Thomas Magoon, Phyllis R. Magrab, George L. Marx, Arnold Medvene, J. Winston Martin, Donald K. Pumroy, Philip Ray, David J. Rhoads, Otto Spielbichler, Herbert J. Stern, Franklin Westbrook.

Programs of preparation are offered by the Department of Counseling and Personnel Services at the master's degree, advanced graduate specialist, and doctoral degree levels for counselors in elementary and secondary schools, rehabilitation agencies, community agencies, college and university counseling centers. It also offers programs of preparation for other personnel services: college student personnel administration, visiting teacher and psychological services in schools.

Course Code Prefix—EDCP

CRIMINAL JUSTICE AND CRIMINOLOGY

Professor and Director: Lejins.*
Criminology Program:
Assistant Professor: Maida.*
Lecturer: Debro.*
Part-Time Lecturers: Courtless, Blake.
Law Enforcement Curriculum:
Assistant Professors: Ingraham, Johnson.
Lecturer: Calder.
Part-Time Lecturers: Murdy, Wolman.

ADVISORY COUNCIL: The Advisory Council is made up of representatives of the areas of education, law, psychiatry, psychology, public administration, social work, sociology, and University College: Professor Richard P. Claude, Department of Government and Politics; Dean Stanley J. Drazek, University College; Professor Abraham Dash, School of Law; Dr. Jonas Rappeport, Psychiatric Institute; Professor Joan Hunt, Institute of Child Study; Dean Daniel Thursz, School of Social Work; Professor Robert S. Waldrop, Department of Psychology.

ADVISORY BOARD: The Advisory Board is made up of representatives of the state agencies in the field of law enforcement and corrections, representatives of appropriate private agencies and organizations as well as representatives of national agencies and organizations: Mr. Norman A. Carlson, Director, Bureau of Prison, U.S. Department of Justice; Mr. Dulaney Foster, Chief Judge Supreme Bench of Baltimore City; Mr. Robert J. Lally, Secretary, Department of Public Safety and Correctional Services, State of Maryland; Mr. Donald D. Pomerleau, The Police Commissioner, City of Baltimore; Mr. Milton G. Rector, Executive Director, National Council on Crime and Delinquency; Dr. E. Preston Sharp, General Secretary, The American Correctional Association; Mr. Quinn Tamm, Executive Director, International Association of Chiefs of Police.

The purpose of the Institute is to provide an organizational and administrative basis for the interests and activities of the University, its faculty and students in the areas usually designated as law enforcement, criminology and corrections. The Institute is to promote study and teaching concerning the problems of crime and delinquency by offering and coordinating academic programs in the area of law enforcement, criminology and corrections; managing research in these areas; and conducting demonstration projects.

The Institute comprises as its component parts:

1. The Criminology Program.
2. The Law Enforcement Curriculum.
3. The program leading to a Bachelor of Arts in General Studies with specializations in law

*Joint appointment with Sociology

enforcement and corrections offered by the University College.

4. Other appropriate divisions to be developed for the areas of research and demonstration projects.

The major in criminology and corrections comprises 30 hours of course work in criminology and law enforcement, divided as follows: 24 hours in criminology; 6 hours in law enforcement; 6 hours of methodology and statistics are required; supporting courses, 24 hours in sociology, psychology, government and politics and other social sciences (see recommended list in the Institute office). The major may be brought up to 36 hours. No grade lower than C may be used toward the major.

Course Code Prefix—CRIM

The major in law enforcement comprises 30 hours of course work in law enforcement and criminology, the latter being offered as courses in the Criminology Program, divided as follows: 18, but not more than 24, hours in law enforcement; 6, but not more than 12 hours in criminology; 6 hours in methodology and statistics; supporting courses, 18 hours in government and politics, psychology or sociology (see recommended list in the Institute office). Student may use an additional 6 hours to bring the major up to 36 hours. No grade lower than C may be used toward the major.

Course Code Prefix—LENF

DANCE

Professor and Chairman: Madden.
Associate Professor: Rosen.
Assistant Professors: Warren, Weaver and Witt.
Visiting Lecturers: Aikens, Freeman and Nicks.
Instructors: Brunner, Frank, Freivogel, McCann, Reynolds, Rooney and Sheppard.

The offerings in the Department of Dance are intended to serve the needs of students who wish to make dance their major effort and also to provide opportunity for those students who would like to explore the role of dance as an art form. Courses serve to develop knowledge of different cultures and arts by studying the place of dance in diverse societies, and in relation to other art forms. Guest artists are scheduled throughout the year, and from time to time a resident artist is teaching.

For those students who choose to major in dance, the department provides courses of training which prepare them for performance, choreography, and continuation of studies of dance and related arts at the graduate level. It is also possible for the student to choose dance history, criticism or dance archives as a career. The curriculum includes music for dance and rhythmic invention as well as related theatre subjects.

The Bachelor of Arts degree is awarded to those whose interest is basically in the cultural, performing and composing aspects of the dance and teaching on the college level. The Bachelor of Science degree is offered with a major in teaching.

It should be noted that the dance major programs are demanding ones of faculty and students alike, implying the giving of time, energy and dedication to the program. Students prepared to meet this challenge are warmly welcomed.

Courses in dance theory, literature and technique (modern, ballet, and ethnic) are open to all students who have completed the specified prerequisites, acquired the equivalent experience or secured the permission of the chairman of the department. Performing groups and a professional company are open to qualified students.

THE BACHELOR OF ARTS DEGREE

The Department requirement includes a core program of 14 hours in dance techniques and 24 in theory and literature. Dance majors are required to take 12 hours in related disciplines, and to be in a technique course each semester.

No course with a grade of less than C may be applied toward the fulfillment of the course requirements for a major in dance.

Students are placed in technique classes according to their level of achievement and progress.

Course Code Prefix—DANC

EARLY CHILDHOOD-ELEMENTARY EDUCATION

Early Childhood Education: Kathleen G. Amershek, Marilyn Church, Regina Goff, Sarah H. Leeper, Carol Seefeldt, Thomas D. Yawkey.
Elementary Education: Evelyn Anderson, Robert B. Ashlock, Thomas A. Butler, Bruce W. Brigham, H. Beth Davey, Maureen Dietz, Robert V. Duffey, George Eley, Walter N. Gantt, Mary Anne Hall, Wayne L. Herman, Lloyd B. Hutchings, Richard K. Jantz, Martin L. Johnson, Susannah M. McCuaig, Sara A. Moretz, Richard W. O'Donnell, Leo W. O'Neill, Jesse A. Roderick, Elisabeth Schumacher, Dorothy D. Sullivan, V. Phillips Weaver, David L. Williams, John W. Wilson, Robert M. Wilson.

The Department of Early Childhood-Elementary Education offers two undergraduate curricula leading to the Bachelor of Science degree:

1. Early Childhood Education—for the preparation of teachers in nursery school, kindergarten and primary grades (grades one, two and three).
2. Elementary Education—for the preparation of teachers of grades one through six.

Students who wish to become certificated teachers for nursery school and/or kindergarten must follow the early childhood education curriculum

(1. above). Students who seek certification for teaching the intermediate grades must follow the elementary education curriculum (2. above). Students who plan to teach in the primary grades can achieve certification in either 1. or 2.

After June commencement 1972, all students graduating in early childhood education or elementary education will fulfill the requirements of the appropriate present curriculum or its counterpart as of June 1966, depending upon the date of admission to the Department of Early Childhood-Elementary Education.

AREA OF ACADEMIC CONCENTRATION

Students in early childhood-elementary education are required to develop within their degree programs an area of academic concentration consisting of a minimum of 18 semester hours, at least 12 semester hours beyond required work in the area. Approved areas are: anthropology, astronomy, botany, chemistry, economics, English, fine arts (art, dance, drama, and music), foreign language, geography, geology, health, history, mathematics, natural sciences (astronomy, botany, chemistry, geology, meteorology, physics, zoology), philosophy, physics, psychology, recreation, social science (economics, government and politics, psychology, sociology), sociology, zoology.

GRADUATION REQUIREMENTS

One hundred twenty (120) academic credits *plus* the four semester hours in required health and physical education are necessary for graduation. At least 80 of the academic credits must be in fields other than education.

EARLY CHILDHOOD EDUCATION

(Nursery-Kindergarten-Primary)

The Early Childhood Education curriculum has as its primary goal the preparation of nursery school, kindergarten and primary teachers.

Observation and student teaching are done in the University Nursery-Kindergarten School on the campus and in approved schools in nearby communities.

Graduates receive a Bachelor of Science degree and meet the requirements for certification for teaching kindergarten, nursery school and primary grades in Maryland, the District of Columbia, Baltimore and many states. Students should have had extensive experience in working with children prior to the junior year.

	Semester	
Freshman Year	I	II
ENGL 101—Composition or ENGL 171—Honors Composition or alternate	3	..
English Literature	..	3
SPHR 202—Fundamentals of General American Speech or SPCH 100—Public Speaking or SPCH 110—Voice and Diction	3	..
HLTH 105—Science and Theory of Health	(2)	..
Physical Education	(1)	(1)
MUSC 155—Fundamentals	3	..
ARTE 100—Fundamentals of Art Education or APDS 101—Fundamentals of Design		3
BOTN 100—General Botany or BIOL 101 or ENTM 100—Insects or MICB 200—General Microbiology or ZOOL 101—General Zoology	3 or 4*	
ASTR 100—Introduction to Astronomy or CHEM 103—General Chemistry or GEOL 100—Geology or PHYS 111—Elements of Physics, Mechanics, Heat and Sound	..	3 or 4*
HIST 221—History of the U.S. to 1865 or HIST 222—History of the U.S. since 1865 or HIST 223—Social and Cultural History of Early America or HIST 224—Social and Cultural History of Modern America or HIST 225— The U.S. in World Affairs	..	3
Approved elective	..	3
	15 or 16	16 or 17

*Two of the three science requirements must be laboratory courses.

Sophomore Year		
English Literature	3	..
MATH 210—Elements of Mathematics	4	..
MATH 211—Elements of Geometry	..	4
GEOG 100—Introduction to Geography	..	3
ANTH 101 or ECON 201 or ECON 205 or GNED 260 or GVPT 170 or GVPT 100 or GVPT 300 or PSYC 100 or SOCY 100	3	3
BOTN 100 or ENTM 100 or MICB 200 or ZOOL 101 or ASTR 100 or GEOL 100 or PHYS 111 or BIOL 101	3 or 4*	..
HIST 231—Latin American History or HIST 241—Western Civilization or HIST 242—Western Civilization or HIST 251—The Humanities or HIST 252—The Humanities or HIST 253—History of England and Great Britain or HIST 254—History of England and Great Britain or HIST 261—Far Eastern Civilization or HIST 262—Far Eastern Civilization or HIST 271—Islamic Civilization or HIST 272—Islamic Civilization	..	3
Approved elective	3	3
	16 or 17	16

*Two of the three science requirements must be laboratory courses.

Junior Year		
Fine Arts or Philosophy	3	..
EDUC 300—Human Development and Learning	6	
EDEL 301—Science in the Elementary School	..	2
EDEL 306—Social Studies in the Elementary School	..	2
EDEL 332—Student Teaching, Primary (8) [1]	..	8
EDEL 313—Mathematics in the Elementary School.	..	2
EDEL 325—The Teaching of Reading	..	2
Approved electives	6	
	15	16

[1] Blocked with special sections of EDEL 301, 306, 313, and 325.

Senior Year		
MUED 450—Music in Early Childhood Education	3	..
EDEL 303—Activities & Materials in Early Childhood Education	3	..
EDUC 301—Foundations of Education	..	3
EDEL 330—Student Teaching, Nursery School (4)[2]	4	..
EDEL 331—Student Teaching, Kindergarten (4)[2]	4	..
EDEL 310—The Child and the Curriculum	2	..
Approved electives	..	12
	16	15

[2] Blocked with special sections of EDEL 303, 310 and MUED 450.

ELEMENTARY EDUCATION

This curriculum is designed for regular undergraduate students who wish to qualify for teaching positions in elementary schools. Students who complete the curriculum will receive the Bachelor of Science degree, and they will meet the Maryland State Department of Education requirements for the Standard Professional Certificate in Elementary Education. The curriculum also meets certification requirements in many other states, Baltimore and the District of Columbia.

	Semester	
Freshman Year	I	II
ENGL 101 or ENGL 171—Honors Composition or alternate	3	..
English Literature	..	3
SPHR 202—Fundamentals of General American Speech or SPCH 100—Public Speaking or SPCH 110—Voice and Diction	3	..
HLTH 105—Science and Theory of Health	(2)	..
Physical Education	(1)	(1)
MUSC 155—Fundamentals	3	..
ARTE 100—Fundamentals of Art Education or APDS 101—Fundamentals of Design	..	3
BOTN 100—General Botany or BIOL 101 or ENTM 100—Insects or MICB 200—General Microbiology or ZOOL 101—General Zoology	3 or 4	..
ASTR 100—Introduction to Astronomy or CHEM 103—General Chemistry or GEOL 100—Geology or PHYS 111—Elements of Physics; Mechanics, Heat and Sound	..	3 or 4*
HIST 221—History of the U.S. to 1865 or HIST 222—History of the U.S. since 1865 or HIST 223—Social and Cultural History of Early America or HIST 224—Social and Cultural History of Modern America or HIST 225—The U.S. in World Affairs	..	3
Approved elective	..	3
	15 or 16	16 or 17

*Two of the three science requirements must be laboratory courses.

Sophomore Year		
English Literature	3	..
MATH 210—Elements of Mathematics	4	..
MATH 211—Elements of Geometry	..	4
GEOG 100—Introduction to Geography	..	3
ECON 201 or ECON 205 or ANTH 101 or GNED 260 or GVPT 170 or GVPT 100 or GVPT 300 or PSYC 100 or SOCY 100	3	3
BOTN 100 or ENTM 100 or MICB 200 or ZOOL 101 or ASTR 101 or GEOL 100 or PHYS 111 or BIOL 101	3 or 4*	..
HIST 231—Latin American History or HIST 232—Latin American History or HIST 241—Western Civilization or HIST 242—Western Civilization or HIST 251—The Humanities or HIST 252—The Humanities or HIST 253—History of England and Great Britain or HIST 254—History of England and Great Britain or HIST 261—Far Eastern Civilization or HIST 262—Far Eastern Civilization or HIST 271—Islamic Civilization or HIST 272—Islamic Civilization	..	3
Approved Electives	3	3
	16 or 17	16

*Two of the three science requirements must be laboratory courses.

Junior Year			
Fine Arts or Philosophy	3		
EDUC 300—Human Development and Learning	6	or	6
EDEL 302—Science in the Elementary School	2		..
EDEL 305—Language Arts in the Elementary School	..		2
EDEL 307—Social Studies in the Elementary School	2		..
EDEL 314—Mathematics in the Elementary School	..		2
EDEL 326—The Teaching of Reading	..		2
Approved electives	2 or 8		3 or 9
	15		15
Senior Year			
EDEL 333—Student Teaching in the Elementary School	16		..
EDUC 301—Foundations of Education	..		3
EDEL 312—Art in the Elementary School or MUED 352—Music for the Elementary Classroom Teacher or PHED 420—Physical Education for Elementary School	..		2 or 3
Approved electives	0		9
	16		14 or 15

PHYSICAL EDUCATION AND HEALTH EDUCATION CURRICULUM—ELEMENTARY SCHOOL

Students majoring in elementary education may pursue an area of specialization in elementary school physical education and health education. Students interested in this area should consult the Dean of the College of Physical Education, Recreation and Health.

MUSIC EDUCATION CURRICULUM—ELEMENTARY SCHOOL

Students majoring in elementary education may pursue an area of specialization in elementary school music education with vocal or instrumental emphasis, and thereby qualify for the Bachelor of Science certificate in special subjects.

In order to fulfill requirements in this area, the

following courses should be taken in addition to those required in the elementary education curriculum. Students are also required to pass the Musicianship Examination given by the Music Education Division before the students enroll for student teaching. (Students should consult their advisor in music education for details.)

A. *General Music,* 18 semester hours. Music theory, MUSC 150, 151, 250 (3,3,4); music literature and history, MUSC 131, 331 (3,3); conducting, MUSC 490 (2).

B. *Applied Music,* 14 semester hours divided between private and class instruction. Students must complete MUSC 209 on their major instrument. Students in the instrumental option elect six semester hours of class instruction from MUSC 113-122; 213.

C. *Professional Courses,* eight semester hours. Methods, MUED 462 for vocal emphasis, or MUED 410 (2) for instrumental emphasis; six semester hours of student teaching, (included in the 16 hours of student teaching required of Early Childhood-Elementary Education majors.)

FOREIGN LANGUAGE—ELEMENTARY SCHOOL (FLES)

Foreign Language Curriculum—Early Childhood-Elementary majors, foreign language majors, and secondary education foreign language majors are eligible for admission. Students interested in FLES should contact the Foreign Language Education advisor in the Department of Secondary Education for further information concerning the requirements for certification in FLES.

Course Code Prefix—EDEL

ECONOMICS

Professor and Department Chairman: Dillard.
Professors: Adelman, Almon, Bergmann, Bishop, Cumberland, Gruchy, McGuire, O'Connell, Olson, Schultze, Ulmer, and Wonnacott.
Associate Professors: Aaron, Adams, Bennett, Clague, Dodge, Dorsey, Harris, Knight, McLoone, Meyer, Singer, Straszheim, and Weinstein.
Assistant Professors: Atkinson, Betancourt, Boorman, Christensen, Day, Denny, Greer, Harrison, Huh, King, Layher, MacRae, Madan, Peterson, Qualls, Schiller, and Whitman.
Instructors: Betts, Guelzo, McConnell, Neri, and Schwer.
Lecturers: Amuzegar, Bailey, Bolino, Dardis, Hinrichs, Lady, Measday, Mills, Moore, Pierce, and Snow.

The program of studies in economics is designed to meet the needs of students who wish to concentrate either on a major or minor scale in this division of the social sciences. Students who expect to enroll in the professional schools and those who are planning to enter the fields of business, public administration, foreign service, or social service administration will find courses in economics of considerable value to them in their later work. A student of economics should choose courses to meet the requirements for his major objective. If he expects to pursue graduate study, he should consult Graduate School Announcements for the general requirements for advanced degrees.

REQUIREMENTS FOR THE ECONOMICS MAJOR

In addition to the University requirements in General Education, the student majoring in economics is required to complete a minimum of 36 semester hours in economics with an average grade of not less than C. Required courses are ECON 110, 201, 203, 401, and 403, and BSAD 230 (Statistics). Economics 421 may be taken in lieu of BSAD 230 by those with a strong background and interest in mathematics. The lower division courses must be completed with an average grade of not less than C.

Economics majors are expected to take ECON 401 prior to taking ECON 430 or 440 and ECON 403 prior to taking ECON 450, 454, 460 or 470. ECON 401 and 403 will provide the theoretical foundation for "sections recommended for the economics major." Special sections for economics majors may be offered in ECON 430 and 440.

Other courses in economics to meet the requirements of the major are to be selected with the aid of a faculty advisor. Business administration courses which may count as economics credit are BSAD 230, 330, 430, 431, 432, and 481.

All economics majors must take six semester hours of mathematics.

Economics majors may elect to take a foreign language or, in lieu of foreign language, may take BSAD 110 and GEOG 203, depending on their college.

An economics honors program is open to economics majors entering their junior year. Students must have an academic average of at least 3.0 to be eligible for admittance to this program.

ELECTRICAL ENGINEERING

Professor and Chairman: DeClaris.
Professors: Caceres, Chu, Durrani, Hochuli, Ligomenides, Lin, Newcomb, Popov, Reiser, Rutelli (Emeritus), Taylor, Wagner and Weiss.
Associate Professors: Abrams, Basham, Emad, Harger, Kim, Lee, Pugsley, Rao, Shabana, Simons, Torres and Tretter.
Assistant Professors: Boston, Degtyar, Ephremides, Friedman, Gallman, LeVine, Levine, Lieberman, O'Grady, Paez, Rhee, Robinson, Silio, Zajac and Zaki.
Lecturers: Colburn and Pottala.
Instructors: Littlepage and Castro.

The Electrical Engineering Department is now operating with a new B.S. curriculum. The change to the new program became effective in the spring, 1973 semester. The description below briefly discusses the salient features of the program.

Flexibility is the main characteristic of the new program. The student can specialize more than before, or he can have a broader education, as he chooses. This is established through broader elective structure both within and outside the Electrical Engineering Department.

Specialization areas available to the student are: Biomedical, Circuits, Communications, Computers, Control, and Electrophysics. These areas include such fields as: Electronics, Integrated Circuits, Bioelectronics, Solid State Devices, Lasers, Radar, Radio, Space Navigation, Information Theory, Telemetry, Antennas, Automatic Control, System Theory, Cybernetics, Computer Software and Hardware, Particle Accelerators, Electromechanical Transducers, Energy Conversion, and many others.

Apprenticeship programs allow qualified undergraduate students to work with research laboratory directors in the Department, thus giving the student a chance for a unique experience in research and engineering design.

Projects in Electrical Engineering allow undergraduate students to do independent study under the guidance of a faculty member in an area of mutual interest.

A new Fundamentals Laboratory and several Specialty Laboratory courses have been established. These are self contained and may be taken independently of related theoretical courses. These laboratories provide theoretical and practical experience in classical and modern topics using up to date equipment.

The boundary between electrical engineering and applied mathematics or applied physics is becoming steadily less distinct, particularly at the research level. Simultaneously, the technological problems and needs of society are becoming steadily more complex. The engineer is the intermediary between science and society. To solve the problems of modern society he must fully understand the most modern devices and methodologies available. To find the best solution he must have a very broad interdisciplinary education. To find a solution that is also acceptable to society he must be concerned with the economic, ecologic and human factors involved in the problem. Finally, current research topics frequently require a thorough knowledge of advanced mathematics and physics.

The new curriculum of the Electrical Engineering Department reflects the diverse requirements cited above. A basic mathematical, physical and engineering sciences foundation is established in the first two years. Once this foundation is established, the large number of electrical engineering courses and the flexibility of the elective system allow a student to specialize or diversify and to prepare for a career either as a practicing engineer or for more theoretically oriented graduate work.

To go along with this freedom, the Department has a system of undergraduate advising. The student is encouraged to discuss his program and career plans with his advisor in order to get maximum benefit from the new curriculum.

ELECTRICAL ENGINEERING CURRICULUM

BASIC FRESHMAN YEAR

Course No. and Title	Semester I	Semester II
HLTH 105—Science and Theory of Health	(2)	..
CHEM 103, 104—General Chemistry**	4	4
PHYS 161—General Physics I	..	3
MATH 140, 141—Analysis I, II	4	4
ENES 101—Intro Engr. Science	3	..
ENES 110—Mechanics	..	3
General Education Courses	3	3
Physical Activities	(1)	(1)
Total Credits	17	18

Students who are not prepared to schedule MATH 140 are advised to schedule MATH 115 (3 cr.) and ENGL 101 (3 cr.) in the Summer Session before the fall (first) Semester. MATH 115 does not count toward fulfilling the requirements of an engineering degree . . . . . it is a preparatory course. Otherwise, students will schedule their freshman year as showing in the following:

ALTERNATE FRESHMAN YEAR

Course No. and Title	Semester I	Semester II	Summer
HLTH 105—Science and Theory of Health	(2)		
CHEM 103, 104—General Chemistry **	4	4	
PHYS 161—General Physics I			3
MATH 115—Intro to Analysis ***	3		
MATH 140, 141—Analysis I, II		4	4
ENES 101—Intro. Engr. Science	3		
ENES 110—Mechanics		3	
General Education Courses	3	6	
Physical Activities	(1)	(1)	
Total Credits	16	18	7
SOPHOMORE YEAR		I	II
General Education Courses		3	3
MATH 246—Differential Equations		..	3
MATH 241—Analysis III		4	..
PHYS 262, 263—General Physics		4	4
ENES 240—Algorithmic Analysis and Computer Programming		2	
ENES 243—Digital Computer Laboratory		1	
ENES 221—Dynamics		3	
ENEE 204—Systems and Circuits I		..	3
ENEE 250—Computer Structures		..	3
Total Credits		17	16
JUNIOR YEAR		I	II
MATH xxx—(Elective Advanced Math)		3	..
ENEE 320—Engineering Probability		3	..
ENEE 380—Electromagnetic Theory		3	..

**Qualified students may elect to take CHEM 105 and 106 (4 cr. hrs. each) instead of CHEM 103 and 104.

***MATH 115 is an additional course for those students who do not qualify to begin with MATH 140.

ENEE 381—Electromagnetic Wave Propagation		3
ENEE 304—Systems and Circuits II	3	
ENEE 305—Fundamental Laboratory	2	
ENEE 322—Signal and System Theory		3
ENEE 314—Electronic Circuits		3
ENEE xxx—Specialty Elective Laboratory		2
Electives*		3
General Education Courses	3	3
Total Credits	17	17
SENIOR YEAR		
ENEE xxx—Specialty Elective I and II	3	3
Electives*	9	9
General Education Courses	3	3
Total Credits	15	15

*Of the twenty-one elective credits, a minimum of three credits must be from electrical engineering, and a minimum of nine credits from other fields of engineering, mathematics, physics, or other suitable scientific disciplines. Three credits of free electives are allowed, and the remaining six credit hours are technical electives and may be taken from EE or other technical areas (including MATH, PHYSICS or other scientific fields). All elective courses must be of 300 level or higher. However, one course of less than the 300 level may be taken if that course is a prerequisite to a 300 level course or higher that the student wishes to pursue. In all cases the student's elective program must be approved by an electrical engineering advisor and, in addition, by the Office of Undergraduate Studies of the Electrical Engineering Department if a less than 300 level course is to be credited toward graduation.

Technical electives available in Electrical Engineering are described in the course listings. Any course numbered 400 to 499 inclusive that is not specifically excluded in its description may be used as part of a technical elective program. Approval by the student's faculty advisor of an in depth technical elective program is required. Specialty electives are listed below.

Throughout the year students are urged to contact the Electrical Engineering Undergraduate Studies Office for advice or any other matters related to their studies.

For students planning to continue in graduate work, technical electives should be selected to provide the best possible preparation for the probable areas of graduate specialization.

ENEE SPECIALTY ELECTIVES

Circuits:
- ENEE 414—Network Analysis (3)
- ENEE 416—Network Synthesis (3)

Communications:
- ENEE 420—Communication Theory (3)
- ENEE 421—Introduction to Information Theory (3)

Biomedical:
- ENEE 434—Introduction to Electrical Processes in Biology and Medicine I (3)
- ENEE 435—Introduction to Electrical Processes in Biology and Medicine II (3)

Computers:
- ENEE 444—Logic Design of Digital Systems (3)
- ENEE 446—Computer Architecture (3)

Control:
- ENEE 460—Introduction to Control I (3)
- ENEE 462—Introduction to Control II (3)

Electrophysics:
- ENEE 480—Electromagnetic Properties of Materials (3)
- ENEE 481—Antenna (3)

ENEE SPECIALTY ELECTIVE LABORATORIES

- ENEE 413—Electronics Laboratory (2)
- ENEE 445—Computer Laboratory (2)
- ENEE 461—Control Systems Laboratory (2)
- ENEE 483—Electromagnetic Measurements Laboratory (2)

Or an approved laboratory research program (e.g., apprenticeship).

ENGINEERING MATERIALS PROGRAM

Professors: Armstrong,* Arsenault,** Asimow,* Marcinkowski,* and Skolnick.**

Associate Professors: Bolsaitis,** and Spain.**

Engineering materials is the study of the relationship between structure and properties of materials. The principles of physics, chemistry and mathematics are applied to metals, ceramics, polymers and composite materials used in industrial applications. In addition to the traditional area of metallurgy, engineering materials includes the fields of solid state physics and polymer and materials science and their application to modern industrial problems. Because of the extensive use of materials, the engineer finds a wide variety of interesting career opportunities in many companies and laboratories.

Programs of study in engineering materials at the undergraduate and graduate level are offered through the Chemical and Mechanical Engineering Departments. Students may use Engineering Materials as a field of concentration in the Bachelor of Science in Engineering Program.

Course Code Prefix—ENMA
*Member of Mechancial Engineering Department.
**Member of Chemical Engineering Department.

ENGINEERING SCIENCES PROGRAM

Engineering science courses represent a common core of basic material offered to students of several different departments. All freshman and sophomore students of Engineering are required to take ENES 101, ENES 110, ENES 220 and ENES 221. Other ENES courses 230, 240, and 243 are specified by the different departments or taken by the student as technical electives. The responsibility for teaching the Engineering Science courses is divided among the Civil, Mechanical, Chemical and Electrical Engineering Departments. In addition to the core courses noted above, several courses of general interest to engineering or non-engineering students have been given ENES designations.

Course Code Prefix—ENES

ENGLISH LANGUAGE AND LITERATURE

Professor and Acting Chairman: Russell.
Professors: Bode, Breyer, Cooley (Emeritus), Fleming, Freedman, Hovey, Isaacs, Lawson, Lutwack, McManaway, Manning, Mish, Murphy, Myers, Panichas, Russell, Schoeck, Whittemore, Zeeveld (Emeritus).
Associate Professors: Andrews (Emerita), Barnes, Barry, Birdsall, Brown, Coleman,[1] Cooper, Fry, Gravely, Greenwood, Hamilton, G., Herman, Holton, Houppert, Howard, Jellema, Kenny, Kinnaird, Miller, Peterson, Perloff, Portz, Salamanca, Smith, G., Thorberg, Vitzthum, Walt, Ward, Weber (Emeritus), Wilson.
Assistant Professors: Beauchamp, Cate, Cothran, Dunn, Gallick, Hamilton, D., James,[2] Kelly, Kenney, Kimble, Kleine, Kolker, Levinson,[3] Martin, Moore, Rowe, Rutherford, Steinberg, Swigger, Tyson, Van Egmond, Weigant.
Visiting Lecturers: Glazer, Jabbour.
Instructors: Buhlig,[3] Demaree, Ference, Gold, Potash, Schmeissner, Smith, N., Stevenson, Townsend, Trousdale.

The English major requires 30 credits, suitably distributed as indicated in departmental announcements, beyond the General Education requirements. A student may pursue a major with emphasis in English, American or Comparative Literature; in folklore, creative writing, or in linguistics; or in preparation for secondary school teaching. Students interested in secondary teaching should make it known to the department as early in their college career as possible.

No course with a grade less than C may be used to satisfy major requirements.

In selecting minor or elective subjects, students majoring in English, particularly those who plan to do graduate work, should give special consideration to courses in French, German, Latin, philosophy, and history.

HONORS

The Department of English offers an honors program, primarily for majors but open to others with the approval of the Departmental Honors Committee. Interested students should ask for detailed information from an English department advisor no later than the beginning of their junior year.

Course Code Prefix—ENGL

ENTOMOLOGY

Professor and Department Chairman: Bay.
Professors: Bickley, Jones, Harrison, Messersmith, and Steinhauer.
Associate Professors: Davidson and Menzer.
Assistant Professors: Caron and Reichelderfer.
Lecturers: Heimpel and Spangler.

This curriculum prepares students for various types of entomological positions or for graduate work in any of the specialized areas of entomology. Professional entomologists are engaged in fundamental and applied research in university, government, and private laboratories; regulatory and control activities with federal and state agencies; commercial pest control and pest management services; sales and development programs with chemical companies and other commercial organizations; consulting, extension work; and teaching.

Most of the first two years of the curriculum is devoted to obtaining the essential background. In the junior and senior years there is an opportunity for some specialization or for electing courses in preparation for graduate work. Students contemplating graduate work are strongly advised to elect courses in physics, modern foreign languages, mathematics, and biometrics.

DEPARTMENT OF ENTOMOLOGY REQUIREMENTS

	Semester Credit Hours
ZOOL 101—General Zoology	4
ZOOL 102—The Animal Phyla	4
BOTN 100—General Botany	4
MICB 200—General Microbiology	4
CHEM 103, 104—College Chemistry I, II	4,4
CHEM 201, 202—College Chemistry III and College Chemistry Laboratory III	3,2
MATH 110, 111—Introduction to Mathematics	3,3
or MATH 140, 141—Mathematical Analysis	4,4
ZOOL 246—Genetics	4
or BOTN 414—General Plant Genetics	3
or ANSC 201—Basic Principles of Animal Genetics	3
2 of the following 3 courses:	
BOTN 212—Plant Taxonomy	3
BOTN 221—Diseases of Plants	4
CHEM 461—Biochemistry I	3
ENTM 200—Introductory Entomology	3
ENTM 421—Insect Taxonomy and Biology	4
ENTM 432—Insect Morphology	4
ENTM 442—Insect Physiology	4
2 of the following 3 courses:	
ENTM 451—Economic Entomology	4
ENTM 462—Insect Pathology	3
ENTM 472—Medical and Veterinary Entomology	4
ENTM 399—Special Problems	2
ENTM 498—Seminar	1
Electives	18-23

Course Code Prefix—ENTM

FAMILY AND COMMUNITY DEVELOPMENT

Associate Professor and Chairman: Gaylin.
Associate Professors: Lemmon, Myricks, Olson, Wilson.
Assistant Professors: Brabble, Churaman, Rubin, Orvedal.
Instructors: Cornelius, Garrison, Marshall, Miller, O'Dowd.
Lecturer: Greenwald, Lieberman, Messersmith.

The department of Family and Community Development integrates and applies aspects of the natural and social sciences as well as the human

[1] Joint appointment with Afro-American Studies Program.
[2] Joint appointment with College of Education.
[3] Joint appointment with Dean's Office.

arts—all of which enhance man's quest for a more fully functioning life. It places particular emphasis upon the allied departments within the College of Human Ecology which in turn addresses itself to the problems of man and his immediate environment.

Specifically Family and Community Development provides the applied human science generalist with a firm foundation of knowledge of family and community dynamics leading to service, teaching, and research vocations. It also serves the University community by offering general courses germaine to problems of living in a complex society, and stresses the concept of the family as the working interface between man, his society and the world around him.

There are four specific though related foci within the program leading to specialized areas of endeavor within the applied human sciences.

I. *Family Studies:* This course of study stresses a working knowledge of the growth of individuals throughout the life span with particular emphasis on intergenerational aspects of family living. It examines the pluralistic family forms and life styles within our post technological complex society and the development of the individual within the family within the community.

II. *Community Studies:* This program emphasizes the processes of social change and the individual as agent within that process. It is grounded upon the knowledge of community structure and the workings and interactions of the various subsystems. Its summary goals are the identification and utilization of community resources for the enhancement of a better life for the individuals within the social system.

III. *Management and Consumer Studies:* This program focuses upon the use of resources of the home and its impact upon the community. It examines the integration of individual, familial, and societal values of our technological society for the purposes of goal implementation within that society. It is the area of study most directly concerned with quality of life and the preparing of the individual for effective consumer decisions through the understanding of the interrelationship of consumers, business, and government.

IV. *Home Economics Education:* Although often narrowly perceived as delimited to the role of educator within a secondary school setting, Home Economics Education has a larger purview and responsibility, i.e., that of introducing and implementing through education at all levels, the theories, skills and philosophy of the attainment of a better life for all men, women and children. Thus it is the major interpreter of the ramification and potential impact of Home Economics—the applied human sciences.

These areas of concentration will prepare students for roles as family life educators, extension specialists, consumer consultants, mental health team members, and teachers of home economics at the secondary level.

FAMILY STUDIES CURRICULUM

Supportive courses will be selected from either Human Ecology or Sociology-Psychology.

Typical Freshman Year	Semester Hours
ENGL 101, 201—Composition and Literature	6
PSYC 100	3
FMCD 105—Introduction to Family Living	3
APDS 101—Fundamentals of Design or HUMAN ECOLOGY ELECTIVE	3
SOCY 100—Sociology of American Life	3
FOOD 110—Food and Nutrition of Individuals and Families or NUTR 100 or HUMAN ECOLOGY ELECTIVE	3
TEXT 105—Textiles in Contemporary Living or HUMAN ECOLOGY ELECTIVE	3
Biological Science	3-4
Health and Physical Education Requirements	(4)
Total	31-32

Typical Sophomore Year	Semester Hours
ENGL Requirement	3
Physical Science	3-4
SPCH 107 or 100—Public Speaking	2-3
ECON 205—Fundamentals of Economics	3
Fine Arts or Philosophy	3
MATH Requirement	3
FMCD 250—Decision Making in Family Living	3
FMCD 260—Family Relations	3
Supportive Courses	6
FMCD 270 or Elective	2-3
Total	31-34

Junior Year	Semester Hours
FMCD 431—Family Crisis and Disintegration	3
FMCD 330—Family Patterns	3
EDHD 413, 306 or 411—Human Development	6
History Requirement	6
FMCD 332—The Child in the Family	3
Supportive Courses	6
Electives	6
Total	33

Senior Year	Semester Hours
FMCD 487—Legal Aspects of Family Problems	3
FMCD 485—Introduction to Family Counseling	3
FMCD 345 or 346—Practicum or Living Experience with Families	3-6
Supportive Courses	6
Electives	15
Total	30-33

COMMUNITY STUDIES CURRICULUM

Supportive courses will be chosen from the following areas:

Human Ecology courses.

Sociology and/or psychology or family life courses in the Department of Family and Community Development beyond the core requirements.

Government and/or economics, or management and consumer problems courses in the Department of Family and Community Development beyond the core requirements.

Typical Freshman Year	Semester Hours
ENGL Requirement	6
Math Requirement	3
SOCY 100—Introduction to Sociology	3
FOOD 110—Food & Nutr. of Individuals & Families OR NUTR 100 or HUMAN ECOLOGY ELECTIVE	3
FMCD 105—Introduction to Family Living	3
Biological Science	3-4
APDS 101—Fund. of Design or HUMAN ECOLOGY ELECTIVE	3
TEXT 105—Tex. in Contemporary Living or HUMAN ECOLOGY ELECTIVE	3
PSYC 100—Introduction to Psychology	3
Physical Education and Health Requirement	(4)
Total	34-35

Typical Sophomore Year	Semester Hours
ENGL Requirement	3
Fine Arts or Philosophy	3
CHEM 103 (or other Science)	3-4
ECON 205—Fund. of Economics	3
FMCD 250—Decision Making in Family Living	3
SPCH 107 or 100—Public Speaking	2-3
FOOD 200—Scientific Principles of Food or Elective	3
FMCD 270—Professional Seminar or Elective	2-3
History	3
Supportive Courses	3
Total	28-31

Typical Junior Year	Semester Hours
FMCD 330—Family Pattern OR SOCY 443	3
FMCD 341—Personal and Family Finance	3
SOCY 230—Dynamics of Social Interaction	3
FOOD 260—Meal Management OR FOOD 300—Economics of Food Consumption	3
Supportive Courses	12
Electives	6
Total	30

Typical Senior Year	Semester Hours
FMCD 345—Practicum with Families OR FMCD 344—Residence Experience OR FMCD 346—Living Experiences with Families	3
FMCD 370—Communication Skills	3
SOCY 330—Community Organization	3
History Requirement	3
Supportive Courses	9
Electives	9
Total	30

MANAGEMENT AND CONSUMER STUDIES CURRICULUM

Supportive courses will be selected in blocks from economics, business administration, public relations, sociology, psychology, family life, or consumer economics.

Typical Freshman Year	Semester Hours
ENGL Requirement	3
Math Requirement	3
TEXT 105—Textiles in Contemporary Living or HUMAN ECOLOGY ELECTIVE	3
SOCY 100—Introduction to Sociology	3
PSYC 100—Introduction to Psychology	3
CHEM 103, OR Physical Science Requirement	3-4
FOOD 110—Food & Nutr. of Individuals and Families or NUTR 100 or HUMAN ECOLOGY ELECTIVE	3
SPCH 107 or 100—Public Speaking	2-3
APDS 101—Fundamentals of Design or HUMAN ECOLOGY ELECTIVE	3
Health and Physical Education Requirements	(4)
Total	30-32

Typical Sophomore Year	Semester Hours
FMCD 270—Professional Seminar or Elective	2-3
ECON 201 and ECON 203—Principles of Econ.	6
Biological Science	3-4
PSYC 221—Social Psychology	3
TXAP 221—Apparel I OR TXAP 441 OR TEXT 150—Intro. to Textile Materials	3
ENGL Requirement	6
FMCD 250—Decision Making in Family Living	3
Fine Arts or Philosophy	3
FOOD 200 or Elective	3
Total	32-34

Typical Junior Year	Semester Hours
FMCD 330—Family Patterns	3
FMCD 280—Household Equipment and Space Utilization OR HSAD 241—Family Housing	3-4
FMCD 341—Personal and Family Finance	3
Statistics	3
History	6
SOCY 230—Dynamics of Social Interaction	3
FOOD 260—Meal Management OR FOOD 300—Food Economics	3
Supportive	6
Total	30-31

Typical Senior Year	Semester Hours
FMCD 332—The Child in the Family	3
FMCD 443—Consumer Problems	3
FMCD 344—Resident Experience OR FMCD 345—Practicum	3
Electives	15-20
Supportive Courses	3
Total	27-32

HOME ECONOMICS EDUCATION CURRICULUM

The focus of the curriculum is designed to prepare teachers to concentrate on contemporary family functions. This is implemented through the required courses listed below.

Fifteen hours of the total curriculum include an area of concentration which must be unified in content and which will be chosen by the student.*

*Area of Concentration, 15 semester hours
A) Including maximum of two home economics courses with the remainder of the 15 hours in supporting behavioral, physical and biological sciences, philosophy, special education, or human development
B) Of the 15 hours, nine must be upper division

Typical Freshman Year	Semester I	Semester II
ENGL Requirement	3	..
SOCY 100—Introduction to Sociology	3	..
FMCD 105—Introduction to Family Living	3	..
FOOD 110—Food and Nutr. of Indiv. & Fam. OR NUTR 100—Elements of Nutrition	3	..
MATH requirement	3-4	..
PHED	(1)	(1)
PSYC 100—Introduction to Psychology	..	3
APDS 101—Fundamentals of Design	..	3
Literature	..	3
HLTH 105—Science and Theory of Health	..	(2)
TEXT 105—Textiles in Contemp. Living	..	3
EDSE 151—Seminar: Home Ec Education	..	1
Total	16-17	16

Typical Sophomore Year		
ENGL Requirement	3	..
HIST	3	..
CHEM 103—General Chemistry	4	..
HSAD 240—Design and Furnishings in the Home OR HSAD 241—Family Housing	3	..
SPCH 100—Public Speaking	3	..
TXAP 221—Principles and Methods of Clothing Design	..	2
HIST	..	3
CHEM 104—General Chemistry	..	4
FOOD 200—Scientific Principles of Food	..	3
Fine Arts or Philosophy Requirement	..	3
FMCD 250—Decision Making in Family Living	..	3
EDSE 210 Soph. Seminar: Home Ec Education	1	
Total	17	18

Typical Junior Year		
EDUC 300S—Human Development and Learning	6	..
FOOD 260—Meal Management	3	..
FMCD 341—Personal and Family Finance or alternative	3	..
Area of concentration*	3	..
FMCD 332—The Child in the Family OR EDHD 411—Growth and Development in Early Childhood	..	3
ECON 205—Fundamentals of Economics	..	3
EDSE 425—Curriculum Development in Home Economics	..	3
ZOOL 101 or MICB 200	..	4
EDSE 423A—Field Experience: Child Devp.	1	..
Area of concentration*	..	3
Total	16	16

Typical Senior Year	Semester I	Semester II
EDSE 330—Principles and Methods of Secondary Education	3	..
EDSE 347—Curriculum, Instruction and Observation	3	..
EDSE 370—Teaching Secondary Vocational Home Economics	8	..
FMCD 344—Resident Experience in Home Management OR FMCD 345—D. H. M. Practicum	3	..
FMCD 260—Family Relations OR SOCY 433—The Family and Society	..	3
EDUC 301—Foundations of Education	..	3
Area of concentration*	..	9
Total	17	15

Course Code Prefixes—FMCD, HOEC

FIRE PROTECTION ENGINEERING PROGRAM

Professor and Chairman: Bryan.
Assistant Professor: Hickey.

Fire protection is concerned with the scientific and technical problems of preventing loss of life and property from fire, explosion and related hazards, and of evaluating and eliminating hazardous conditions.

The fundamental principles of fire protection are relatively well-defined and the application of these principles to a modern industrialized society has become a specialized activity. Control of the hazards in manufacturing processes calls for an understanding not only of measures for fire protection but of the processes themselves. Often the most effective solution to the problem of safeguarding a hazardous operation lies in the modification of the process rather than in the installation of special extinguishing equipment. The expert in fire protection must be prepared to decide in any given case what is the best and most economical solution of the fire prevention problem. His recommendations are often based not only on sound principles of fire protection but on a thorough understanding of the special problems of the individual property.

Modern fire protection utilizes a wide variety of mechanical and electrical equipment which the student must understand in principle before he can apply them to special problems. The fire protection curriculum emphasizes the scientific, technical and humanitarian aspects of fire protection and the development of the individual student.

The problems and challenges which confront the specialist in fire protection include the reduction and control of fire hazards due to processes subject to fire or explosion in respect to design, installation and handling, involving both physical and human factors; the use of buildings and transportation facilities to restrict the spread of fire and to facilitate the escape of occupants in case of fire; the design, installation and maintenance of fire detection and extinguishing devices and systems; and the organization and education of persons for fire prevention and fire protection.

BASIC FRESHMAN YEAR

Course No. and Title	Semester I	Semester II
HLTH 105—Science and Theory of Health	(2)	..
CHEM 103, 104—General Chemistry**	4	4
PHYS 161—General Physics	..	3
MATH 140, 141—Analysis I, II	4	4
ENES 101—Intro Engr. Science	3	..
ENES 110—Mechanics	..	3
General Education Courses	3	3
Physical Activities	(1)	(1)
Total Credits	17	18

Students who are not prepared to schedule MATH 140 are advised to schedule MATH 115

(3 cr.) and ENGL 101 (3 cr.) in the Summer Session before the fall (first) Semester. MATH 115 does not count toward fulfilling the requirements of an engineering degree . . . . . it is a preparatory course. Otherwise, students will schedule their freshman year as showing in the following:

ALTERNATE FRESHMAN YEAR

Course No. and Title	Semester I	II	Summer
HLTH 105—Science and Theory of Health	(2)		
CHEM 103, 104—General Chemistry **	4	4	
PHYS 161—General Physics I			3
MATH 115—Intro to Analysis ***	3		
MATH 140, 141—Analysis I, II		4	4
ENES 101—Intro. Engr. Science	3		
ENES 110—Mechanics		3	
General Education Courses	3	6	
Physical Activities	(1)	(1)	
Total Credits	16	18	7

**Qualified students may elect to take CHEM 105 and 106 (4 cr. hrs. each) instead of CHEM 103 and 104.
***MATH 115 is an additional course for those students who do not qualify to begin with MATH 140.

SOPHOMORE YEAR	I	II
General Education Requirement	3	3
MATH 240—Linear Algebra	4	
MATH 246—Differential Equations		3
PHYS 262, 263—General Physics	4	4
ENES 220—Mechanics of Materials	3	
ENES 221—Dynamics		3
ENFP 251—Fire Protection Engineering	1	
ENFP 280—Urban Fire Problem Analysis		3
ENFP 290—Ignition and Combustion Phenomenon	2	
Total	17	16

JUNIOR YEAR	I	II
General Education Requirements	3	3
CMSC 110—Elementary Algorithmic Analysis or ENCE 360—Engineering Analysis & Computer Programming	3	
ENME 320—Thermodynamics or ENCE 295—Chemical Process Thermodynamics		3
ENCE 300—Fundamentals of Engineering Materials	3	
ENCE 330—Fluid Mechanics		3
ENFP 310—Fire Protection Systems Design	3	
ENFP 312—Fire Protection Fluids I		3
ENFP 320—Pyrometrics of Materials	3	
ENFP 321—Functional and Structural Evaluation		3
Approved Electives	2	2
Total	17	17

SENIOR YEAR		
General Education Requirements	3	3
ENEE 300—Principles of Electrical Engineering	3	
ENCE 350—Fundamentals of Structural Analysis or ENME 411—Introduction to Industrial Engineering		3
ENME 410—Operations Research I or BSAD 332—Operations Research I		3
ENNU 215—Introduction to Nuclear Technology	3	
ENFP 415—Fire Protection Fluids II	3	
ENFP 411—Systems Approach to Fire Protection Design		3
ENFP 414—Life Safety Analysis	3	
ENFP 416—Problem Synthesis and Design		3
Technical Electives	3	3
Total	18	18

Course Code Prefix—ENFP

FLUID DYNAMICS AND APPLIED MATHEMATICS

Professor and Director: Crane.
Professors: Aziz,[1] Babuska, Bhatia,[1] Brush,[2] Crane, DeClaris,[3] Dorfman,[1] Elsasser, Faller, Hubbard, Jones, Karlovitz, Kellogg, Landsberg, Lashinsky, Olver, Ortega,[5] Pai, Tidman, Weiss,[3] Wilkerson, Wu, Zwanzig.
Professors (Visiting or Part-Time): Fritz, Northrop.
Associate Professors: Coplan, Fix, Guernsey, Israel,[6] Koopman, Matthews, Rodenhuis, Rosenberg, Yorke.
Associate Professors (Visiting or Part-Time): Ogilvie, Papadopoulos.
Assistant Professors: Gage, Thompson, Vernekar.
Assistant Professors (Visiting or Part-Time): Bjordal, Hsieh, Miller.
Visiting Lecturers: Bonner, Gerrity.
Professors Emeritus: Burgers, Martin.

The Institute for Fluid Dynamics and Applied Mathematics is a center for applied interdisciplinary research in areas requiring combined efforts in physical and mathematical sciences, environmental sciences, and engineering. It hosts a faculty of eminent stature to promote a variety of programs, many involving members of other departments on campus and from other institutions. Its purpose is to provide graduate training for students interested in having an opportunity to perform research in a multidisciplinary environment.

The Institute faculty conducts theoretical and experimental research in meteorology, atomic and molecular physics, plasma physics, atmospheric physics, fluid dynamics, statistical mechanics, history of science, theoretical biology and geophysics, and in all areas of applied mathematics. Applied mathematicians in the Institute are currently studying topics in numerical analysis, control theory, nonlinear processes, elasticity, asymptotic expansions, approximation theory, and in application of mathematics to the life sciences and environmental sciences. Individual research efforts are coordinated wherever possible to constitute broad programs in the atmospheric, environmental, space and life sciences. Research topics are determined entirely by the interests of students and faculty. Interdepartmental programs are strongly encouraged.

[1] Joint with University of Maryland Baltimore County
[2] Joint with History
[3] Joint with Electrical Engineering
[4] Joint with Physics.
[5] Joint with Computer Science and Mathematics.
[6] Joint with Civil Engineering.

Institute faculty attempt to provide opportunities for outstanding undergraduate students to participate in their research programs wherever possible. Although the number of research positions for undergraduates is limited, inquiries of possibilities for employment will be welcomed by Institute faculty. The courses taught by Institute faculty are listed in the various catalogues of the University as offerings in Meteorology, Physics, Mathematics, and so forth. These are available to undergraduates according to the general University regulations.

Students interested in pursuing advanced study within the Institute may be admitted to the University as graduate students in any department of engineering, or in Mathematics, Physics, or Chemistry. Those interested in meteorology may be admitted directly to the Graduate Program in Meteorology,* which exists within the Institute. Further information may be obtained by writing to the Director of the Institute for Fluid Dynamics and Applied Mathematics.

FOOD, NUTRITION AND INSTITUTION ADMINISTRATION

Professor and Chairman: Prather.
Associate Professors: Ahrens, Butler and Cox.
Assistant Professor: Eheart.
Visiting Assistant Professors: Berdanier, Manchester and Sanford.
Instructors: Knighton, Niffenegger, Graham, Norton, Cantrell and Kaul.
Lecturers: Boehne, Stewart and Forbes.
Visiting Instructors: Sager, and Palmer.

The area of food, nutrition and institution administration is broad and offers many diverse professional opportunities. Courses introduce the student to the principles of selection, preparation and utilization of food for human health and the welfare of society. Emphasis is placed on the scientific, cultural and professional aspects of this broad area of food and nutrition. The department offers six areas of emphasis: experimental foods, community nutrition, nutrition research, dietetics, institution administration, and a coordinated dietetic internship. Each program provides for competencies in several areas of work; however, each option is designed specifically for certain professional careers.

All areas of emphasis have in common several courses within the department and the University; the curricula are identical in the freshman year.

Experimental foods is designed to develop competency in the scientific principles of food and their reactions. Physical and biological sciences in relation to foods are emphasized. The program is planned for students who are interested in product development, quality control and technical research in foods. The nutrition research program is designed to develop competency in the area of nutrition for students who wish to emphasize physical and biological sciences. The community nutrition program emphasizes applied community nutrition. Dietetics develops an understanding and competency in food, nutrition and management as related to problems of dietary departments; the curriculum includes courses necessary to meet the academic requirement for American Dietetic Association internship and membership. The coordinated dietetic internship program includes internship experience coordinated with the didactic components and the students are eligible for membership in the American Dietetic Association upon graduation. Institution administration emphasis is related to the administration of quantity food service in university and college residence halls and student unions, school lunch programs in elementary and secondary schools, restaurants, coffee shops, and industrial cafeterias. The curriculum meets academic requirements for approved college, industry or business internship and membership in the American Dietetic Association.

FRESHMAN CURRICULUM

Freshman Year	Semester I	Semester II
ENGL 101—Composition	3	..
Literature Requirement	..	3
MATH 110 or 115	3	..
FOOD 240—Science of Food Preparation	..	3
SPCH 107—Public Speaking	2	..
FOOD 110—Food and Nutrition of Individuals and Families	3	..
ZOOL 101—General Zoology	..	4
CHEM 103, 104—College Chemistry I, II	4	4
HLTH 105—Science and Theory of Health	..	(2)
Physical Education	(1)	(1)
FOOD 105—Professional Orientation	1	..
Total	17	17

EXPERIMENTAL FOODS EMPHASIS

Sophomore Year	I	II
CHEM 201, 202—College Chemistry III	5	..
PSYC 100—Introduction to Psychology	3	..
HUMAN ECOLOGY Core Course	3	3
FOOD 250—Science of Food Preparation	3	..
Literature Requirement	..	3
ECON 205—Fundamentals of Economics	..	3
MICB 200—General Microbiology	..	4
Fine Arts or Philosophy Requirement	..	3
Total	14	16

Junior Year	Semester I	Semester II
HIST—History Requirement	3	3
SOCY 100—Introduction to Sociology	3	..
HUMAN ECOLOGY Core	..	3
NUTR 300—Science of Nutrition	4	..
FOOD 440, 450—Advanced and Experimental Food Science	3	3
CHEM 461, 462—Biochemistry	3	3
FDSC 412 or 413—Principles of Food Processing I, II	..	3
Total	16	15

*See the separate listing for the Meteorology Program.

Senior Year		
PHYS 111—Elements of Physics	3	..
FDSC 422—Food Product Research and Development	..	3
FDSC 432—Analytical Quality Control	..	3
Electives [3]	12	8
Total	15	14

[3] Nine hours of the 20 electives must be selected from the following list:

AGRI 401—Agricultural Biometrics (3) or FDSC 431—Statistical Quality Control (3)
CHEM 219—Elements of Quantitative Analysis (3)
Any 300 or 400 level NUTR course
FOOD 260—Meal Management (3)
FOOD 300—Economics of Food Consumption (3)
FOOD 445—Advanced Food Science Lab. (1)
FOOD 480—Food Additives (3)
FOOD 490—Special Problems in Foods (3)
FDSC 430—Food Microbiology (3)
FDSC 412 or 413 if not taken above
IADM 430—Quantity Food Production (3)
FMCD 370—Communication Skills and Techniques in Home Economics (3)

COORDINATED DIETETICS EMPHASIS

Sophomore Year	I	II
CHEM 201, 202—Chemistry III	5	..
CHEM 261—Introductory Biochemistry	..	3
FOOD 250—Science of Food Preparation	3	..
FOOD 260—Meal Management	..	3
ZOOL 201, 202—Anatomy & Physiology	4	4
Literature Requirement	3	..
MICB 200—General Microbiology	..	4
HUMAN ECOLOGY Core Course	3	..
PSYC 100—Introduction to Psychology	..	3
Total	18	17

Junior Year		
NUTR 300—Science of Nutrition	4	..
NUTR 450—Advanced Nutrition	..	3
IADM 300—Food Service Organization and Management	3	..
IADM 430—Quantity Food Production	3	..
IADM 460, 470—Administrative Dietetics I, II	3	3
IADM 440—Food Service Personnel Administration	..	2
IADM 420—Quantity Food Purchasing	..	3
Human Ecology Core Course	3	3
EDHD 460—Educational Psychology	..	3
Total	16	17

Senior Year		
History Requirement	3	3
SOCY 100—Introduction to Sociology	3	..
NUTR 460—Therapeutic Nutrition	3	..
NUTR 480—Applied Diet Therapy	3	..
ECON 205—Fundamentals of Economics	3	..
Elective	..	3
Fine Arts or Philosophy Requirement	..	3
NUTR 470—Community Nutrition	..	3
NUTR 485—Applied Community Nutrition	..	3
Total	15	15

DIETETICS EMPHASIS

Sophomore Year	I	II
CHEM 201, 202—Chemistry III	5	..
FOOD 250—Science of Food Preparation	3	..
PSYC 100—General Psychology	3	..
ZOOL 201, 202—Anatomy & Physiology	4	4
ECON 205—Fundamentals of Economics	..	3
Literature Requirement	..	3
FOOD 260—Meal Management	..	3
HUMAN ECOLOGY Core Course	..	3
Total	15	16

Junior Year		
NUTR 300—Science of Nutrition	4	..
IADM 300—Food Service Organization and Management	3	..
History Requirement	3	3
CHEM 461, 462—Biochemistry	3	3
HUMAN ECOLOGY Core Course	3	3
IADM 420—Quantity Food Purchasing	..	3
NUTR 450—Advanced Nutrition	..	3
Total	16	15

Senior Year		
NUTR 460—Therapeutic Nutrition	3	..
MICB 200—General Microbiology	..	4
Fine Arts or Philosophy Requirements	3	..
IADM 430—Quantity Food Production	3	..
IADM 440—Food Service Personnel Administration	..	2
EDHD 460—Educational Psychology	3	..
SOCY 100—Introduction to Sociology	..	3
Electives	3	4
Total	15	13

INSTITUTE ADMINISTRATION EMPHASIS

Sophomore Year	I	II
FOOD 250—Science of Food Preparation	3	..
HUMAN ECOLOGY Core Course	3	3
MICB 200—General Microbiology	4	..
ZOOL 201, 202—Anatomy — Physiology	4	4
ECON 205—Fundamentals of Economics	..	3
Literature Requirement	..	3
PSYC 100—Introduction to Psychology	..	3
Total	14	16

Junior Year	I	II
History Requirement	3	3
SOCY 100—Introduction to Sociology	..	3
NUTR 300—Science of Nutrition	4	..
IADM 300—Food Service Organization and Management	3	..
HUMAN ECOLOGY Core Course	3	..
BSAD 220, 221—Accounting	3	3
IADM 420—Quantity Food Purchasing	..	3
Electives	..	3
Total	16	15

[1]Students not planning to meet academic requirements for ADA may substitute approved additional courses in business administration or the social sciences.

Senior Year		
IADM 430—Quantity Food Production	3	..
IADM 440—Food Service Personnel Administration	..	2
IADM 450—Food Service Equipment and Planning	2	..
BSAD 380 or ECON 470—Business Law or Labor Economics	3	..
IADM 350 or 490—Special Problems or Practicum in Institution Administration	..	3
Fine Arts or Philosophy requirement	3	..
Electives	3	10
Total	14	15

COMMUNITY NUTRITION EMPHASIS

Sophomore Year	I	II
CHEM 201, 202—Chemistry III	5	..
PSYC 100—Introduction to Psychology	3	..

FOOD 250—Science of Food Preparation	3	
ZOOL 201, 202—Anatomy & Physiology	4	4
Literature Requirement		3
HUMAN ECOLOGY Core Course		3
FOOD 260—Meal Management		3
CHEM 261—Introductory Biochemistry		3
Total	15	16
Junior Year		
NUTR 300—Science of Nutrition	4	
SOCY 100—Introduction to Sociology	3	
MICB 200—General Microbiology	4	
NUTR 450—Advanced Nutrition		3
HUMAN ECOLOGY Core Course	3	3
Fine Arts or Philosophy Requirement		3
ECON 205—Fundamentals of Economics		3
Elective		3
Total	14	15
Senior Year		
NUTR 460—Therapeutic Nutrition	3	
NUTR 470—Community Nutrition		3
EDHD 460—Educational Psychology	3	
Methods of Teaching Course		3
History Requirement	3	3
Electives	6	6
Total	15	15

NUTRITION RESEARCH EMPHASIS

Sophomore Year	I	II
CHEM 201, 202—Chemistry III	5	
PSYC 100—Introduction to Psychology	3	
FOOD 250—Science of Food Preparation	3	
ZOOL 201, 202—Anatomy & Physiology	4	4
Literature Requirement		3
HUMAN ECOLOGY Core Course		3
MICB 200—General Microbiology		4
SOCY 100—Introduction to Sociology		3
Total	15	17
Junior Year		
History Requirement	3	3
HUMAN ECOLOGY Core Course	3	3
CHEM 461, 462—Biochemistry	3	3
CHEM 463, 464—Biochemistry Lab	2	2
NUTR 300—Science of Nutrition	4	
NUTR 450—Advanced Nutrition		3
Total	15	14
Senior Year		
AGRI 401—Agricultural Biometrics	3	
NUTR 490—Special Problems in Nutrition		3
ECON 205—Fundamentals of Economics		3
Fine Arts or Philosophy Requirement		3
Electives	9	8
Total	15	14

FOOD SCIENCE PROGRAM

Professor and Chairman: Stark (Horticulture).
Professors: Young (Animal Science), Davis, King and Mattick (Dairy Science); Kramer, Scott, Twigg and Wiley (Horticulture).
Associate Professors: Buric (Animal Science); Bigbee (Poultry Science).
Assistant Professors: Westhoff (Dairy Science); Heath and Thomas (Poultry Science).

Food Science applies the fundamentals of the physical and biological sciences to the problems of procurement, preservation, processing, packaging, and marketing foods in a manner that would satisfy man's needs both nutritionally and aesthetically.

Opportunities for careers in food science exist in areas of meats, milk and milk products, fruits and vegetables, poultry and eggs, sea food, baby foods, confections, pet foods, cereals, flavors and colors, etc. Specific positions in industry, universities, and government, include product development, production, engineering, research, quality control, technical service, technical sales, and teaching.

The science requirement will be satisfied by completing the following courses:

	Semester Credit Hours
BOTN 100—General Botany or ZOOL 101—General Zoology	4
CHEM 103,104—College Chemistry I,II	4,4
MICB 200—General Microbiology	4

CURRICULUM REQUIREMENTS

AGEN 313—Mechanics of Food Processing	4
ANSC 401—Fundamentals of Nutrition	3
CHEM 201,202—College Chemistry III and College Chemistry Laboratory III	3,2
FDSC 111—Introduction to Food Science	3
FDSC 398—Seminar	1
FDSC 412,413—Principles of Food Processing I, II	3,3
FDSC 421—Food Chemistry	3
FDSC 422—Food Product Research and Development	3
FDSC 430—Food Microbiology	4
FDSC 431—Statistical Quality Control	3
FDSC 432—Analytical Quality Control	3
FDSC Commodity Course*	6
PHYS 121—Fundamentals of Physics	4
Electives	10

* FDSC 442, 451, 461, 471 or 482.
Course Code Prefix—FDSC

FRENCH AND ITALIAN LANGUAGES AND LITERATURES

Professor and Chairman: MacBain.
Professors: Bingham, Guyon, Quynn (Emeritus), Rosenfield.
Visiting Professor: Suckling.
Associate Professors: Demaitre, Fink, Hall, Tarica.
Assistant Professors: Bridgers, Gilbert, Hicks, Lebreton-Savigny, McArthur, Meijer, Salchenberger.
Lecturer: Lloyd-Jones.
Instructors: Abbate, Barrabini, Bondurant, Dubois, Gottlieb, Guieu, Lapov, Murawski, Nespoulous-Neuville, Quilici, Ragazzi, Tubbs, Vaccarelli.

The department offers a major in French, which consists of 39 credits of French courses beyond the level of the foreign language requirement. The French major must complete eight of the following courses: FREN 201, 211, 221, 301, 302, 311, 312, 321, 322, and any five French courses numuered above 330, one of which must be 401 or 405. Students intending to apply for admission to graduate programs in French in this department

must take no less than four literature courses at the 400-level.) An average grade of C is the minimum acceptable in the major field. Students intending to apply for teacher certification should consult the departmental Director of Undergraduate Advising, Dr. Marianne Meijer, as early as possible in order to plan their programs accordingly.

HONORS

The department offers an honors program in French for students of superior ability. Honors work normally begins in the first semester of the junior year, but a qualified student may enter as early as the sophomore year or as late as the second semester of the junior year. Honors students are required to take at least two courses from those numbered 491H, 492H, and 493H together with 494H, Honors Independent Study, and 495H, Honors Thesis Research. Honors students must take a final comprehensive examination based on the honors reading list. Admission of students to the honors program, their continuance in the program and the final award of honors are the prerogative of the Departmental Honors Committee.

Course Code Prefixes—FREN, ITAL

GENERAL HONORS PROGRAM

Director: Portz.

The General Honors Program is administered by the Director of the Honors Programs and by the Honors Committee which also acts as an advisory and regulatory body. Students in all Divisions or Colleges are eligible to apply for admission to the program. Admission to the General Honors Program should be made at the same time as admission to the University, although a special and separate application form is required for General Honors and should be sent to the Director of Honors, Honors Office, University of Maryland, College Park, Md. 20742. Students are also admitted after the first and second semesters of the freshman year. Students are selected on the basis of SAT scores, grades, rank in graduating class, recommendations from high school teachers and counselors, and other factors dealing with academic and non-academic achievement in high school. Students transferring from other institutions are accepted into General Honors upon presentation of a distinguished record.

General Honors students are assigned to honors sections of courses, when available, and are given the opportunity of participating in special General Honors seminars. Successful General Honors students are graduated with a citation in General Honors and notation of this accomplishment is made upon their transcripts. For further information and admission to General Honors, write the Director of Honors, as above.

Course Code Prefix—HONR

GEOGRAPHY

Professor and Chairman: Harper.
Professors: Ahnert, Deshler, Fonaroff, Hu.
Associate Professors: Brodsky, Chaves, Thompson, Wiedel.
Assistant Professors: Cirrincione, Dando, Groves, Lewis, Mitchell, Muller.
Lecturers: Rosenthal, Rosing, Roswell, Yoshioka.

Geography studies the spatial patterns and interactions of natural, cultural and socio-economic phenomena on earth's surface. The field thus embraces aspects of both the physical and the social sciences, which are applied in the analysis of patterns of distribution of individual phenomena, to the study of complex interrelations of phenomena found in a given region, and to the synthesis of geographic regions. A geographer should, therefore, acquire background knowledge in certain aspects of the physical as well as the social sciences.

Field work and map analysis have been the basic tools of research for the geographer. In recent years these have been augmented by the use of techniques of air photo interpretation and presently by the development of methods of interpreting data obtained from the remote sensing devices of space satellites. Modern geography also is making increasing application of quantitative methods, including the use of statistics and systems analysis, so that mathematical training is becoming increasingly important for a successful career in geography.

Today geographers are employed in a wide range of positions. Geographers in the federal government work in the Departments of State, Interior, Defense, Agriculture, Housing and Urban Affairs, and Health, Education, and Welfare. They are on the staffs of the legislative research branch, the Library of Congress and the National Archives. At the state and local government level there is an increasing demand for geographers in planning positions. And in recent years more and more geographers have found employment in private industry working on problems of industrial and commercial location and market analysis. Teaching at all levels from elementary school through graduate work continues to employ more geographers each year. Some have found geography to be an excellent background for careers in the military, journalism and general business; others have simply found the broad perspective of geography an excellent base for a general education. Most professional positions in geography require graduate training.

REQUIREMENT FOR AN UNDERGRADUATE MAJOR

Within any of the general major programs it is possible for the student to adjust his program to fit his particular individual interests. The major totals 33 semester hours.

The required courses of the geography core are:

	Hours
1. Geography Core (GEOG 201, 202, 203, 300)	12
2. Field Study (Selected from GEOG 380, 381, 382, 383, 384)	3
3. A regional course	3
4. Elective systematic and technique courses	15
Total	33

The Geography Core—The following four courses form the minimum essential base upon which advanced work in geography can be built:

GEOG 201—Introduction to Physical Geography	3
GEOG 202—Introduction to Cultural Geography	3
GEOG 203—Introduction to Economic Geography	3
GEOG 300—Introduction to Research & Writing	3

The three lower division courses are to be completed prior to GEOG 300 and all other upper division courses. GEOG 201, 202, and 203 may be taken in any order and a student may register for more than one in any semester. GEOG 300 is specifically designed as a preparation to upper division work and should be taken upon completion of one or two upper division courses. Upon consultation with a department advisor, a reasonable load of other upper division work in geography may be taken concurrently with GEOG 300.

The Field Study Requirement—The field study requirement may be completed in either of two ways, depending on which is available in the schedule: (1) by taking Geography 380—Local Field Course. 3 hrs. or (2) by taking *three out of four* of the following one-hour field study courses each stressing a different aspect of geographic field work: GEOG 381—Field Study: Physical; GEOG 382—Field Study: Rural; GEOG 382—Field Study: Urban; GEOG 384—Field Study: Methods. Normally two of the different one-hour courses will be offered each semester, and the student should arrange to take them as is convenient during the junior and senior years.

Introduction to Geography—Geography 100: Introduction to Geography is a general education course for persons who have had no previous contact with the discipline in high school or for persons planning to take only one course in geography. It provides a general overview of the field rather than of a single specialized subdivision. Credit for this course is not applied to the major.

AREAS OF SPECIALIZATION

Although the major program is flexible and can be designed to fit any individual student's own interest, several specializations attract numbers of students. They are:

Urban Geography and Regional Development—Provides preparation for careers in planning and teaching. Majors electing this specialty take departmental courses in urban geography, industrial location, transportation, and economic geography among others and supporting courses in urban sociology, urban economics, and urban transportation outside the department.

Physical Geography—For students with special interest in the natural environment and in its interaction with the works of man. This specialization consists of departmental courses in geomorphology, climatology, and resources, and of supporting courses in geology, soils, meteorology, hydorology, and botany.

Cartography—Prepares students for careers in map design, compilation and reproduction. The department offers various courses in thematic mapping, cartographic history and theory, map evaluation, and map and photo interpretation. For additional training students are advised to take supporting courses in art and civil engineering.

Cultural Geography—Of interest to students particularly concerned with the geographic aspects of population, politics, and other social and cultural phenomena, and with historical geography. In addition to departmental course offerings this specialization depends on work in sociology, anthropology, government and politics, history, and economics.

For further information on any of these areas of interest the student should contact a departmental advisor.

All math programs should be approved by a departmental advisor.

SUGGESTED STUDY PROGRAM FOR GEOGRAPHY (Without Foreign Language)

Freshman Year	Hours
GEOG 100—Introduction to Geography	3
GEOG 201—Introduction to Physical Geography	3
BOTN 100—General Botany	4
GEOL 100—Geology	3
HISTORY—Towards general education requirement	3
ENGLISH—Composition	3
PHILOSOPHY OR FINE ARTS—Towards general education requirement	3
MATH 110 or 115—Towards general education requirement	3
HLTH 105—Health Education	(2)
Physical Activities—(Men and Women)	(2)
Electives	3
	32

Sophomore Year	Hours
GEOG 202—Introduction to Cultural Geography	3
GEOG 203—Introduction to Economic Geography	3
HISTORY—Towards general education requirement	3
ENGLISH 201, 202—World Literature	6
Two Social Sciences—Towards general education requirements	6
Electives—(depending on area of specialization)	9
	30

Junior Year	Hours
GEOG 300—Introduction to Research and Writing in Geography	3
GEOG (A Regional Course)	3
GEOG (Systematic and Techniques courses)	6
Supporting courses and electives	18-21
Alternative to foreign language (BSAD 230 or MATH 240)	3-4
	33-37

Senior Year	Hours
GEOG (Systematic Techniques courses, including 3 hours of field techniques)	12 (minimum)
Supporting courses and electives	18
	30

SUGGESTED STUDY PROGRAM FOR GEOGRAPHY (With Foreign Language)

Freshman Year	Hours
GEOG 100—Introduction to Geography (if needed, see description of course)	3
GEOG 201—Introduction to Physical Geography	3
BOTN 100—General Botany	4
GEOL 100—Geology	3
HISTORY—Towards general education requirements	3
ENGLISH 101—Composition	3
MATH 105 or 110—Fundamentals of Mathematics or Introduction to Mathematics	3-4
HLTH 105—Health Education	(2)
Physical Activities (Men and Women)	(2)
Foreign Language	6
	33-32

Sophomore Year	Hours
GEOG 202—Introduction to Cultural Geography	3
GEOG 203—Introduction to Economic Geography	3
HISTORY—Towards general education requirement	3
ENGLISH 201, 202—World Literature	6
PHILOSOPHY OR FINE ARTS—Towards general education requirements	3
Two Social Sciences—(Towards general education requirements	6
Foreign Language	3
SPCH 100—Public Speaking	3
	30

Junior Year	Hours
GEOG 300—Introduction to Research and Writing in Geography	3
GEOG (A Regional Course)	3
GEOG (Systematic and Techniques Courses)	6
Supporting courses and electives	21
	33

(In this group care must be taken to complete the Arts and Sciences requirement of 12 hours in natural science and mathematics)

Senior Year	Hours
GEOG (Systematic and Techniques courses, including hours of field techniques)	12 (minimum)
Supporting courses and electives	18
	30

GEOGRAPHY MINOR AND SECONDARY EDUCATION GEOGRAPHY SPECIALIZATION

College of Education Majors

Secondary Education Majors with a concentration in geography are required to take 27 hours in the content field. Geography 201, 202, and 203 and either 490 or 300 are required courses. The remaining 15 hours of the program consist of 3 hours of regional geography and 12 hours of upper-division systematic courses. For majors in Elementary Education and others needing a geography course for teaching certification Geography 100 is the required course.

Geography minors should take at least Geog. 201, 202 and 203 in the Geography core and 300 is recommended. As with the major these courses should be taken before any others.

Course Code Prefix—GEOG

GEOLOGY

Associate Professors: Segovia, Siegrist and Stifel.
Assistant Professors: Weidner and Wylie.

The geology curriculum is designed to prepare a student either for a career in geology with a Bachelor of Science degree or for advanced studies in geology.

DEPARTMENTAL REQUIREMENTS

	Semester Credit Hours
CHEM 103,104—College Chemistry I, II	4,4
PHYS 121,122—Fundamentals of Physics	4,4
MATH 140,141—Analysis I, II	4,4
GEOL 100—Introduction to Physical Geology	3
GEOL 102—Historical and Stratigraphic Geology	3
GEOL 110—Physical Geology Laboratory	1
GEOL 112—Historical Geology Laboratory	1
GEOL 399—Research Problems in Geology	1
GEOL 422—Mineralogy	3
GEOL 431—Invertebrate Paleontology	3
GEOL 441—Structural Geology	3
GEOL (Proposed)—Summer Field Camp	5
AGRO 202—General Soils	4
Major electives approved by advisor	12
Electives	27

Course Code Prefix—GEOL

GERMANIC AND SLAVIC LANGUAGES AND LITERATURES

Professor and Chairman: Hering.
Professors: Best, Dobert, Hinderer, Jones.
Associate Professors: Berry, Hitchcock.
Assistant Professors: Dulbe, Elder, Fleck, Irwin, Kostovski, Pfister.
Instructors: Dvorak, Horowitz, Huebschman, Klapouchy, Kornetchuk, Lindes, Logan, Thielke.
Lecturer: Vollmer.

GENERAL

Two types of undergraduate majors are offered in both German and Russian: one for the general student or the future teacher, and the other for those interested in a rounded study of a foreign area for the purpose of understanding another nation through its literature, history, sociology, and other aspects. Both of these majors confer the B.A. degree. The department also offers M.A. and Ph.D. degrees in German language and literature.

An undergraduate major in either category consists of a total of 33 hours with a C average, beyond the basic Arts and Sciences language requirement.

In selecting minor or elective subjects, students majoring in German or Russian, particularly those who plan to do graduate work, should give special consideration to courses in French, Spanish, Latin, philosophy, history, and English.

LANGUAGE AND LITERATURE MAJOR:

GERMAN

German 221, which may be taken concurrently with German 321 or 322, is required unless waived by the head of the department. Specific minimum requirements in the program are: three courses in advanced language (one from each set: 301-302, 311-312, 401-402); two semesters of the survey of literature courses (321-322); six literature courses on the 400-level, two of which may be taken in comparative literature. Taking honors courses as substitute for the 400-level literature courses requires special permission from the head of the department and in no case may more than two honors courses be selected for this purpose.

RUSSIAN

The specific minimum requirements are: one from each set: 201-202, 301-302, 311-312, 401-402; two semesters of the survey of literature courses (321-322), plus 15 hours of literature courses on the 400-level.

FOREIGN AREA MAJOR:

GERMAN

Specific requirements in this major are: three courses in advanced language (one from each set: 301-302, 311-312, 401-402); a 2-semester survey (321-322); two courses in civilization (421-422); four courses in German literature on the 400-level, two of which may be replaced by Comparative Literature 401 and 402. Supporting courses should be selected in consultation with the student's advisor.

RUSSIAN

Specific requirements in this major are: three courses in advanced language (one from each set: 201-202, 301-302, 311-312); Russian 321 and 322; Russian 401 and 402; plus 12 hours of literature courses on the 400-level, two of which may be replaced by Comparative Literature 401 and 402. Supporting courses should be selected in consultation with the student's advisor.

HONORS

A student majoring in German who, at the time of application, has a general academic average of at least 3.0 and 3.5 or above in his major field, is eligible for admission to the Honors program of the department. Application should be directed to the chairman of the Honors Committee. Honors work normally begins in the first semester of the junior year but a qualified student may enter as early as the sophomore years or as late as the second semester of the junior year.

Honors students are required to take two of the Honors reading courses 398H and the independent study course, 397H.

Besides completing an independent study project, all graduating seniors who are candidates for Honors must take an oral examination. Admission of students to the Honors Program, their continuance in the program, and the final award of Honors are the prerogative of the Departmental Honors Committee.

LOWER DIVISION COURSES

There are two tracks of elementary and intermediate courses in German. Track I consists of three semesters of four credits each (GERM 101, 102, 104) and Track II of four semesters of three credits each (GERM 111, 112, 114, 115). The language requirement is satisfied by passing either 104 or 115 or equivalent. Students with only one year of high school language may take courses 101 or 111 and 112 in that language for credit. Students who have had two or more years of German or Russian in high school and wish to continue with that language *must* take the placement exam.

Students who, as a result of the placement exam, place in 103 or 113 must complete 104 or 115. They may not take courses 101-102 or 111-112 for credit unless there has been a four-year lapse of time between their high school language course and their first college course in that language. Those who place above 104 or 115 have fulfilled the language requirement.

Transfer students with college credit have the option of continuing at the level for which they are theoretically prepared, of taking a placement examination, or of electing courses 103 or 113 for credit. If a transfer student takes 103 or 113 for credit, he may retain transfer credit *only* for the equivalent of course 101 or 111. A transfer student placing lower than his training warrants may ignore the placement but *DOES SO AT HIS OWN RISK*.

If a student has received a D in a course and completes the next higher course, he cannot go back to repeat the original D.

A student whose native language is taught at the university may not meet the college requirement by taking courses 101 through 312. There is a special option by which foreign students may offer a combination of FOLA 001 and 002 (English for Foreign Students) and 12 hours of English courses to satisfy both the English and foreign language requirements.

ELEMENTARY HONORS

Courses 102H and 112H in German are limited to specially approved candidates who have passed courses 101 or 111 with high grades and are recommended by their instructors. This will allow them to complete their requirement by completing either 102H or 115.

Course Code Prefixes—GERM, RUSS

GOVERNMENT AND POLITICS

Professor and Department Chairman: Don C. Piper.

Professors: Anderson, Burdette, Dillon, Harrison, Hathorn, Hsueh, Jacobs, McNelly, Murphy, Plischke.

Associate Professors: Claude, Conway, Devine, Glendening, Koury, Ranald, Reeves, Stone, Terchek, Wilkenfeld, Wolfe.

Assistant Professors: Bechtold, Butterworth, Chapples, Glass, Heisler, Ingles, Kapungu, Lanning, Levine, Lyons (visiting), McCarrick, McGregor, Melnick, Oliver, Spencer, Strouse, Werlin.

Lecturers: Barber, Flyr.

Instructors: Henson, Woodworth.

Course Code Prefix—GVPT

The Department of Government and Politics offers programs designed to prepare students for government service, politics, foreign assignments, teaching, a variety of graduate programs, and for intelligent and purposeful citizenship.

At the junior/senior level students may pursue the general government curriculum or they may prusue a more specialized curriculum either in international affairs or in public administration.

REQUIREMENTS FOR THE GOVERNMENT AND POLITICS MAJOR

Government and Politics majors must take a minimum of 36 semester hours in government courses and may not count more than 42 hours in government toward graduation. No course in which the grade is less than C may be counted as part of the major.

The government and politics fields are as follows: (1) American government and politics; (2) comparative government; (3) international affairs; (4) political theory; (5) public administration; (6) public law; and (7) public policy and political behavior.

All government majors are required to take GVPT 100, 170, 220, 441 or 442 (Political Theory), and such other supporting courses as specified by the department. They must take one course from three separate government fields as designated by the department; and in addition: (a) general majors must take at least 15 GVPT semester hours at the 300-400 level; (b) majors taking the international affairs curriculum must complete at least 15 semester hours at the 300-400 level in international affairs and comparative government courses, including GVPT 300; (c) majors taking the public administration curriculum must complete at least 15 semester hours at the 300-400 level in public administration, including GVPT 410. All students majoring in government with specialization in international affairs must take a minimum of 12 semester hours in one foreign language *above the first year elementary course.* (The first year elementary requirement may be waived by high school credit or placement tests.)

All students majoring in government must fulfill the requirements of a minor, which involves the completion of 15 semester hours from approved departments other than GVPT. At least six of the 15 hours must be taken at the 300-400 level from a single department. Students majoring in government with specialization in international affairs may choose to take all minor courses either in geographical area studies or on a departmental basis; geographical area minors may be chosen, with the consent of the departmental advisor, from the following: Africa, East Asia, Europe, Latin America, the Middle East, and the Soviet Union. General majors and majors specializing in public administration may not minor in geographical area studies.

Students who major in government may apply for admission to the GVPT Honors Program during the second semester of their sophomore year. Additional information concerning the Honors Program may be obtained at the departmental offices.

Departmental majors who have completed at least 75 hours towards a degree and at least 15 hours in GVPT are eligible to participate in the Department's Academic Internship Program.

GOVERNMENTAL RESEARCH

Activities of the Bureau of Governmental Research relate primarily to the problems of state and local government in Maryland. The bureau engages in research and publishes findings with reference to local, state and national governments and their interrelationships. It undertakes surveys and offers its assistance and service to units of government in Maryland and serves as a clearinghouse of information for them. The bureau furnishes opportunities for qualified students interested in research and career development in state and local administration.

Urban affairs have become a central focus with the establishment of an Urban Research Group, which draws on a variety of interdisciplinary faculty interests within the University.

The Maryland Technical Advisory Service, a division of the bureau, provides consulting services to county and municipal governments of the State. Technical consultation and assistance are provided on specific problems in such areas as preparation of charters and codes or ordinances, fiscal management, personnel management, utility and other service operations, planning and zoning, and related local or intergovernmental activities. The staff analyzes and shares with governmental officials information concerning professional developments and opportunities for new or improved programs and facilities.

HEALTH EDUCATION

Professor and Chairman: Burt.

Professors: Johnson, Kenel.

Associate Professors: Girdano, Jones, Leviton, Miller, Tifft.

Assistant Professors: Clearwater, Girdano, Needle.

Instructors: Beno, Raymond, Sands.

The curriculum is designed to prepare the student to give leadership in the development of both school and community health. Graduates of the departmental program have placement opportunities as health educators in the public schools, community colleges, as well as in the public and voluntary health agencies.

HEALTH CURRICULUM

	Semester I	Semester II
Freshman Year		
ENGL 101, 201—Composition and American Literature	3	3
SOCY 100—Introduction to Sociology	3	..
ZOOL 101—General Zoology	..	4
SPCH 107—Public Speaking	2	..
PHED—Orientation: Developmental and Combative (Men) or PHED—Orientation Activities Swimming (Women)	(1)	(1)
CHEM 103, 104—General Chemistry	4	4
ANTH 101 or 102—Introduction to Anthropology	3	..
HLTH 140—Personal and Community Health	..	3
Electives	..	3
Total	16	18
Sophomore Year		
ENGL 202—World Literature	3	..
HIST—(General Education Requirements)	3	3
ZOOL 201, 202—Human Anatomy and Physiology	4	4
HLTH 150—First Aid and Safety	..	1
HLTH 270—Safety Education	3	..
PHIL—(General Education Requirement)	..	3
MATH—(Gen. Ed. Requirement other than MATH 001)	3	..
NUTR 100	..	3
Electives	..	3
Total	16	17
Junior Year		
EDMS 410—Educational Measurement or HLTH 480—Measurement in Physical Education and Health	..	3
MICB 200—General Microbiology	4	..
MICB 420—Epidemiology and Public Health	..	2
HLTH 310—Introduction to School Health Education	2	..
HLTH 420—Methods and Materials in Health Education	..	3
EDUC 300—Human Development and Learning	6	..
EDUC 301—Foundations of Education	..	3
PSYC 100—Introduction to Psychology	3	..
PSYC 335—Personality and Adjustment	..	3
Electives	3	3
Total	18	17
Senior Year		
HLTH 340—Curriculum Instruction and Observation		3
HLTH 450—Health Problems of Children and Youth	3	
HLTH 390—Org and Adm. of School Health Programs	3	
EDSE 330—Principles and Methods of Secondary Ed.		3
EDSE 367—Student Teaching in Secondary Schools		8
Electives	9	..
Total	15	14

DEGREE REQUIREMENTS IN HEALTH EDUCATION

Requirements for the Bachelor of Science degree in health education are as follows:

	Sem. Cr.
Foundation science courses (ZOOL 101, 201, 202; MICB 200, 420; CHEM 103, 104)	26
General Education Requirements (ENGL 101, 201, 202; PHIL, ANTH, SOCY I; HIST (6 hours); MATH (Any above MATH 001)	27
Other specified requirements (SPCH 107; PSYCH 100, 335; NUTR 100	11
Professional Health Education courses (HLTH 140, 150, 270, 310, 420, 340, 450, EDMS 410, 480, 390)	24
Education requirements (EDUC 300, 301; EDSE 330, 374)	20
Physical Education requirements	2
Electives	20
Total	130

MINOR IN HEALTH EDUCATION—24 hour minor

Twelve semester hours in health education (HLTH 140, 150, 310, 420, 450)

Twelve semester hours in related areas:

Six semester hours of biological science.

Six semester hours of psychology or human development.

MINOR IN SAFETY EDUCATION

Students wishing to obtain a minor in safety education and become certified to teach safety and driver education in junior and senior high schools should take the following courses: HLTH 150 (1), HLTH 260 (2), HLTH 270 (3), HLTH 280 (3), HLTH 305 (3), HLTH 345 (3), ENPF 280 (3), and ENPF 290 (3). In addition, six hours of psychology (other than the general education requirements) are required.

Course Code Prefix—HLTH

HEARING AND SPEECH SCIENCES

Professor and Chairman: Newby.

Associate Professor: Baker.

Research Associate Professor: Spuehler.

Assistant Professors: Bankson, Cicci,* Doudna, Hamlet, Kumin, Lund, Urban.*

Visiting Assistant Professor: Worthington.

Research Assistant Professor: Elkins.

Instructors: Boss, Ciaranello, Droettboom, Serota.

Research Associates: Revoile, Wintercorn.

*Joint appointment with School of Medicine

The departmental curriculum leads to the Bachelor of Arts degree and prepares the student to undertake graduate work in the fields of speech pathology, audiology, and speech and hearing science. In other words, the undergraduate program in this department is a preprofessional one. The student who wishes to work professionally as a speech pathologist or audiologist must complete at least 30 semester hours of graduate course work in order to meet state and national certification requirements.

The undergraduate major must complete 30 semester hours of courses in the Department of Hearing and Speech Sciences and 18 semester hours of courses in allied fields. No course with a grade less than C may be used to satisfy major requirements. Specific information about major course requirements and acceptable supporting courses may be obtained from the department.

HEBREW PROGRAM

Visiting Professor: Iwry.
Assistant Professor: Greenberg (Chairman).
Instructors: Argaman, Klein, Landa.
Assistant Instructor: Samet.

A minor in Hebrew language and literature consists of 18 semester hours. Six of these hours must be in courses on the 400-level.

Students who have never studied Hebrew, or who have little knowledge beyond reading and writing, may register for Elementary Hebrew without taking a placement examination. Students who have studied Hebrew in a Hebrew high school or day school, in Israel or at another university are required to take the placement examination. On questions of placement above the Hebrew 115 level, students should consult Professor Samuel Iwry.

Course Code Prefix—HEBR

HISTORY

Professor and Chairman: Rundell.
Professors: Bauer (Emeritus), Brush, Callcott, Carter, Cole, Duffy, Foust, Funkenstein, Gilbert, Gordon, Haber, Harlan, Jashemski, Kent, Merrill, Prange, Schuessler, Smith, Sparks.
Associate Professors: Belz, Berry, Breslow, Cockburn, Farrell, Folsom, Giffin, Greenberg, Grimsted, Mayo, Olson, Stowasser, Warren, Yaney.
Assistant Professors: Bradbury, Brann, Flack, Harris, Hoffman, Holum, Kaufman, Lampe, Majeska, Matossian, McCusker, Nicklason, Perinbam, Ridgway, Robertson, Shoufani, Van Ness, Williams, Wright.

The Department of History seeks to broaden the student's cultural background through the study of history and to provide preparation for those interested in secondary school teaching, journalism, research and archival work, government and foreign service and graduate study.

A faculty advisor will assist each major in planning a curriculum to meet his personal interests. A "program plan," approved by the advisor, should be filed with the Department as soon as possible. Students should meet regularly with their advisors to discuss the progress of their studies.

Major Requirements

A. Candidates for a B.A. in History are required to complete 39 hours in History courses.

B. The undergraduate major must attain a grade of C or higher in each of the courses sumitted to fulfill the 39-hour requirement.

C. A minimum of twelve of the 39 hours must be taken at the 300 or 400 levels.

D. The only mandatory course is HIST 389, Proseminar in Historical Writing (3 hours).

E. Before registering for HIST 389, the student is required to have demonstrated proficiency in English composition by

(1) passing (or gaining credit by examination in) ENGL 101, 102, 103 or 171 or equivalent, with a grade of C or higher; *or*

(2) passing the Advanced Placement examition

Supporting Courses

History majors are required to take nine hours at the 300 or 400 levels in appropriate supporting areas outside the History Department. These courses do not all have to be in the same department but the choice of courses must be approved in writing by a faculty advisor.

General Education Requirements in History

All History courses on the 200, 300 and 400 levels are open to students seeking to meet the University requirements in Area C (Division IV, Arts and Humanities) with the exception of HIST 256, 257, 389, 395, 396, 399. A few other courses are open only to students who satisfy specified prerequisites, but that does not limit them to history majors. It should be noted that Special Topics courses—HIST 298 and 398—are offered on several different subjects of general interest each semester; descriptions may be obtained from the History Department office.

Honors in History

Students who major or minor in history may apply for admission to the History Honors Program during the second semester of their sophomore year. Those who are admitted to the program substitute discussion courses and a thesis for some of their required lecture courses, and take an oral comprehensive examination prior to graduation. Successful candidates are awarded either honors or high honors in history.

The History Department offers *pre-honors* work in American history (HIST 256, 257) and *pre-honors* sections in western civilization (HIST 241H, 242H). Students in these sections meet in a discussion group instead of attending lectures. They read widely and do extensive written work on their own. Pre-honors sections are open to any student and are recommended for students in General Honors, subject only to the instructor's approval. Students who intend to apply for admission to the History Honors Program should take as many of them as possible during their freshman and sophomore years.

Course Code Prefixes—HIST, HIFN, HIUS

HORTICULTURE

Professor and Chairman: Stark.
Professors: Kramer, Link, Reynolds, Scott, Shanks, Thompson and Wiley.
Associate Professors: Angell, Baker and Soergel.
Assistant Professors: Bouwkamp and Wegkamp.
Lecturers: Borthwick and Hendee.
Visiting Lecturer: Koch.

The Department of Horticulture offers instruction in pomology (fruits), olericulture (vegetables), floriculture (flowers), ornamental horticulture, and processing of horticultural crops. These courses prepare students to enter commercial production and the horticultural industries such as fruit and vegetable processing, seed production, and retail florists and nurseries. Students are likewise prepared to enter the allied industries as horticulturists with fertilizer companies, equipment manufacturers and others. Students who wish to enter specialized fields of research and teaching may take advanced work in the department.

The Horticultural Education option is designed for persons who wish to prepare for teaching horticulture in the secondary schools. It provides basic training in horticulture and includes the necessary courses for teacher certification.

The Department of Horticulture is a cooperating department in the Food Science curriculum.

The science requirement will be satisfied by completing the following courses:

	Semester Credit Hours
CHEM 103,104—College Chemistry I, II	4,4
BOTN 100—General Botany	4
and four semester credits selected from the following:	
MICB 200—General Microbiology	4
ZOOL 101—General Zoology	4
GEOL 100,110—Geology and Physical Geology Laboratory	3,1
CHEM 201,202—College Chemistry III and College Chemistry Laboratory III	3,2

DEPARTMENTAL REQUIREMENTS—ALL OPTIONS:

	Semester Credit Hours
AGRO 202—General Soils	4
BOTN 221—Diseases of Plants	4
BOTN 441—Plant Physiology	4
HORT 271—Plant Propagation	3
HORT 398—Seminar	1

Completion of the requirements in one of the following options:

POMOLOGY AND OLERICULTURE OPTION:

ENTM 252—Insect Pests of Agricultural Crops	4
HORT 111, 112—Tree Fruit Production	3, 2
HORT 212—Berry Production	3
HORT 222—Vegetable Production	3
HORT 274—Genetics of Cultivated Plants	3
HORT 411—Technology of Fruits	3
HORT 422—Technology of Vegetables	3
HORT 474—Physiology of Maturation and Storage of Horticultural Crops	2
A minimum of three additional horticultural credits	3
Electives	29

FLORICULTURE AND ORNAMENTAL HORTICULTURE OPTION:

BOTN 212—Plant Taxonomy	3
HORT 132—Garden Management	2
HORT 160—Introduction to the Art of Landscaping	3
HORT 231—Greenhouse Management	3
HORT 260—Basic Landscape Composition	2
HORT 274—Genetics of Cultivated Plants	3
HORT 361—Principles of Landscape Design	3
HORT 451—Technology of Ornamentals	3
HORT 453, 454—Woody Plant Materials	3, 3
HORT 432—Fundamentals of Greenhouse Crop Production	3
or	
HORT 456—Production and Maintenance of Woody Plants	3
Select 2 credits from the following:	
HORT 241, 242—Greenhouse Crop Production Laboratory	1, 1
HORT 142—Garden Management Laboratory	1
Electives	25

HORTICULTURAL EDUCATION OPTION:

BOTN 212—Plant Taxonomy	3
EDUC 301—Foundations of Education	3
HORT 132—Garden Management	2
HORT 142—Garden Management Laboratory	1
HORT 160—Introduction to the Art of Landscaping	3
HORT 231—Greenhouse Management	3
HORT 241—Greenhouse Management Laboratory	1
HORT 260—Basic Landscape Composition	2
HORT 361—Principles of Landscape Design	3
HORT 451—Technology of Ornamentals	3
RLED 302—Introduction to Agricultural Education	2
RLED 303—Teaching Materials and Demonstrations	2
RLED 305—Teaching Young and Adult Farmer Groups	1
RLED 311—Teaching Secondary Agriculture	3
RLED 313—Student Teaching	5
RLED 315—Student Teaching	1-4
Elect one of the following courses:	3-6
EDHD 460—Educational Psychology (3)	
EDUC 300—Human Development and Learning (6)	
A minimum of 12 additional Agriculture credits	12
Approved Electives	3-9

Course Code Prefix—HORT

HOUSING AND APPLIED DESIGN

Professor and Acting Chairman: Brabble.
Associate Professor: McWhinnie.
Assistant Professors: Nelson, Ritzmann, Roper.
Instructors: Erdahl, Hillerman, Holvey, Irby, Langley, Odland, Williams, Zimmerman.
Lecturers: Davis, Lawrence, Ribalta.

The Department of Housing and Applied Design offers programs of concentration in five areas of

design: Advertising; Costume; Crafts; Housing; Interior.

The fundamental purpose is to provide a broad general education in addition to individually and professionally oriented instruction in design. The programs teach the discipline and method common to all of the areas and provide the theoretical and technical bases pertinent to each. This foundation can be applied to general and visually-environmental problem solving activities.

ADVERTISING DESIGN: The Advertising Design curriculum is constructed to establish a foundation in the field of graphic communication. Courses are arranged to provide students with the ability to conceptualize imaginatively and to acquire and apply a discriminating introspection for visual form. Courses in Art History and related areas provide breadth as well as depth. Opportunities to examine related fields are offered through elective courses. Students graduating from this curriculum have a broad educational experience qualifying them to begin in many areas of graphic communications.

COSTUME DESIGN: The Costume curriculum is a professionally oriented program designed to prepare students for employment in the many-faceted fashion industry. The advanced courses encourage interviews and on-the-job contacts with working professionals. The program is tailored to the student's career goals by careful selection of elective courses and the allied area block. Graduates completing this major are qualified for careers in fashion design, fashion illustration, display, sales promotion and retailing, fashion reporting and public relations, fashion co-ordination, and photography.

CRAFTS DESIGN: The Crafts curriculum provides the student with a wide range of art and design experience, built upon a broad general education. After exposure to studio work in various craft media, the student should specialize in at least one area in order to become professionally proficient in both designing and execution. The opportunities for employment are primarily teaching in recreational and adult education programs, directing various forms of craft programs for the government, and as a practicing craftsman.

HOUSING: This program is aimed at the exploration of the factors underlying housing problems, the extent of these problems as they exist today, and a projection to future trends and needs. Through integration of relevant findings from sociology, economics, architecture, and psychology, the program will provide a transdisciplinary conceptual framework for the development of applied research/problem-solving methods, and the understanding of the social and behavioral implications of housing processes. The need for housing which mediates behavior-environment congruents is manifest. The need to identify and optimize appropriate environmental systems toward that end is both economically desirable and ecologically necessary. Contemporary concern with social-environmental problems has intensified the requirement for more effective design and planning strategies.

INTERIOR DESIGN: This curriculum provides the student with a background in design theory, history of furniture and architecture with sufficient technical and rendering courses to allow the student to successfully present his work. Experiences within this field allows opportunity for individual expression and style with internships and student organizations providing opportunities to meet professionals in the design field.

ADVERTISING DESIGN CURRICULUM

	Semester I	Semester II
Typical Freshman Year		
ENGL Requirement	3	..
ENGL Requirement	..	3
Math Requirement	3	..
Science Requirement	..	3
SPCH 107 or 100—Public Speaking	2-3	..
ARTS 110—Drawing I	3	..
HLTH 105—Science and Theory of Health	(2)	..
Physical Education	(1)	(1)
EDIN 101A—Mechanical Drawing	..	2
FOOD 110—Food and Nutrition of Individuals and Families or NUTR 100—Elements of Nutrition or HUMAN ECOLOGY Elective	..	3
APDS 101—Fundamentals of Design	3	..
APDS 102—Design II	..	3
Total	17-18	15
Typical Sophomore Year		
ENGL Requirement	3	..
PSYC 100—Introduction to Psychology	3	..
ECON 205—Fundamentals of Economics	..	3
Science Requirement	..	4
FMCD 250—Decision in Family Living or HUMAN ECOLOGY Elective	..	3
TEXT 105—Textiles in Contemporary Living or HUMAN ECOLOGY Elective	3	..
APDS 210—Presentation Techniques	3	..
APDS 211—Action Drawing—Fashion Sketching	..	3
APDS 230—Silk Screen Printing	..	3
APDS 237—Photography	2	..
APDS 103—Design III—Three-Dimensional Design	3	..
Total	17	16
Typical Junior Year	Semester I	Semester II
History Requirement	3	3
SOCY 100—Sociology of American Life	3	..
ARTH 450—Twentieth Century Art	..	3
EDIN 134—Graphic Arts I	3	..
APDS 320—Fashion Illustration	3	..
APDS 330—Typography and Lettering	3	..
APDS 331—Advertising Layout	..	3
APDS 332—Display Design	..	3
Supporting Elective	..	3
Total	15	15

Typical Senior Year		
Fine Arts Requirement—PHIL 330	3	..
APDS 430, 431—Advanced Problems in Advertising Design	3	3
APDS 337—Adanced Photography	..	2
APDS 380—Professional Seminar	..	2
Supporting Electives	3	3
Free Electives	6	4
Total	15	14

COSTUME CURRICULUM

	Semester I	Semester II
Typical Freshman Year		
ENGL Requirement	..	3
Fine Arts Requirement—ARTH 261 (suggested)	3	..
SOCY 100—Sociology of American Life	3	..
ARTS 110—Drawing I	..	3
HLTH 105—Science and Theory of Health	(2)	..
Physical Education	(1)	(1)
Science Requirement	..	3
TEXT 105—Textiles in Contemporary Living	3	..
APDS 101—Fundamentals of Design	3	..
APDS 102—Design II	..	3
APDS 210—Presentation Techniques	..	3
Total	15	16
Typical Sophomore Year		
ENGL Requirement	3	3
Math Requirement	3	..
Science Requirement	..	4
SPCH 107 or 100—Public Speaking	..	2-3
FOOD 110—Food and Nutrition of Individuals and Families or NUTR 100—Elements of Nutrition or HUMAN ECOLOGY Elective	3	..
FMCD 250—Decision Making in Family Living or HUMAN ECOLOGY Elective	..	3
APDS 103—Design III—Three-Dimensional Design	3	..
APDS 211—Action Drawing—Fashion Sketching	3	..
APDS 220—Introduction to Fashion Design	..	3
Total	15	15-16
Typical Junior Year		
PSYC 100—Introduction to Psychology	3	..
History Requirement	3	3
ECON 205—Fundamentals of Economics	..	3
APDS 237—Photography	2	..
APDS 320—Fashion Illustration	3	..
APDS 321—Fashion Design and Illustration	..	3
APDS 330—Typography and Lettering	..	3
Supporting Electives	3	3
Free Elective	3	..
Total	17	15
Typical Senior Year		
APDS 322—Advanced Costume	4	..
APDS 331—Advertising Layout	..	3
APDS 332—Display Design	3	..
APDS 380—Professional Seminar	..	2
Supporting Electives	3	..
Free Electives	6	9
Total	16	14

CRAFTS CURRICULUM

	Semester I	Semester II
Typical Freshman Year		
ENGL Requirement	3	..
ENGL Requirement	..	3
History Requirement	3	..
SOCY 100—Sociology of American Life	..	3
HLTH 105—Science and Theory of Health	(2)	..
Physical Education	(1)	(1)
FOOD 110—Food and Nutrition of Individuals and Families or NUTR 100—Elements of Nutrition or HUMAN ECOLOGY Elective	..	3
TEXT 105—Textiles in Contemporary Living or HUMAN ECOLOGY Elective	3	..
APDS 101—Fundamentals of Design	3	..
APDS 102—Design II	..	3
CRAF 101—Craft Fundamentals and Materials	..	3
Total	15	16
Typical Sophomore Year		
ENGL Requirement	3	..
Math Requirement	3	..
Science Requirement	..	4
PSYC 100—Introduction to Psychology	..	3
SPCH 107 or 100—Public Speaking	..	2-3
EDIN 102—Woodworking I	3	..
APDS 103—Design III—Three-Dimensional Design	3	..
APDS 210—Presentation Techniques	3	..
APDS 211—Action Drawing—Figure Sketching	..	3
CRAF 241—Decorative Textiles	..	3
Total	15	15-16
Typical Junior Year		
PHIL 330—Philosophy of Art	3	..
Science Requirement	3	..
ECON 205—Fundamentals of Economics	..	3
FMCD 250—Decision in Family Living or HUMAN ECOLOGY Elective	..	3
APDS 230—Silk Screen Printing	3	..
APDS 237—Photography	..	2
CRAF 220—Ceramics—Material and Processes	3	..
CRAF 320—Advanced Ceramics I	..	3
CRAF 230—Metalry I	..	3
CRAF 240—Weaving	3	..
Free Elective	..	3
Total	15	17
Typical Senior Year		
History Requirement	3	..
APDS 380—Professional Seminar	..	2
CRAF 420—Advanced Ceramics II	3	..
CRAF 330—Advanced Metalry I	3	..
CRAF 428 or 438 or 448—Individual Problems in Crafts	3	3
Supporting Electives	3	6
Free Electives	..	4-5
Total	15	15-16

HOUSING CURRICULUM

	Semester I	Semester II
Typical Freshman Year		
SOCY 100—Sociology of American Life	3	..
SPCH 100 or 107—Public Speaking	2-3	..
FOOD 110—Food and Nutrition of Individuals and Families	3	..
TEXT 105—Textiles in Contemporary Living	3	..
APDS 101—Fundamentals of Design	3	..
Physical Education	(1)	(1)
ENGL 101 or 171—Composition	..	3
PSYC 100—Introduction to Psychology	..	3
HLTH 105—Science and Theory of Health	..	(2)

TXAP 221—Apparel I or exemption		3
APDS 102—Design II		3
APDS 210—Presentation Techniques		3
Total	15-16	18

Typical Sophomore Year	Semester I	Semester II
ENGL Requirement	3	3
Science Requirement	4	..
PSYC 221—Social Psychology	..	3
FMCD 250—Decision Making in Family Living or Human Ecology Elective	3	..
TEXT 150—Intro. to Textile Mat.	..	3
APDS 103—Design III—Three-Dimensional Design	3	..
HSAD 240—Design and Furnishings in the Home	3	..
HSAD 241—Family Housing	..	3
HSAD 246—Materials of Interior Design	..	3
Total	16	15

Typical Junior Year		
Math Requirement	3	..
Science Requirement	3	..
History Requirement	3	..
SOCY 230—Dynamics of Social Interaction	..	3
Fine Arts Requirement—ARTH 341	..	3
Elective	3	..
FMCD 260—Family Relations or alternative	..	3
HSAD 342—Space Development	3	..
HSAD 343—Interior Design I	..	3
Supporting Elective	..	3
Total	15	15

Typical Senior Year		
History Requirement	3	..
ECON 205—Fundamentals of Economics	..	3
FMCD 330—Family Patterns or alternative	3	..
FMCD 332—The Child in the Family	..	3
Supporting Electives	3	3
Free Electives	6	6
Total	15	15

INTERIOR DESIGN CURRICULUM

Typical Freshman Year	Semester I	Semester II
ENGL Requirement	3	..
ENGL Requirement	..	3
SOCY 100—Sociology of American Life	3	..
History Requirement	..	3
Math Requirement	..	3
HLTH 105—Science and Theory of Health	(2)	..
Physical Education	(1)	(1)
EDIN 101A—Mechanical Drawing	2	..
TEXT 105—Textiles in Contemporary Living	..	3
FOOD 110—Food and Nutrition of Individuals and Families or HUMAN ECOLOGY Elective	3	..
APDS 101—Fundamentals of Design	3	..
APDS 102—Design II	..	3
Total	17	16

Typical Sophomore Year		
ENGL Requirement	3	..
PSYC 100—Introduction to Psychology	3	..
Science Requirement	..	4
ECON 205—Fundamentals of Economics	..	3
SPCH 100 or 107—Public Speaking	2-3	..
FMCD 250—Decision Making in Family Living or HUMAN ECOLOGY Electivve	3	..
TEXT 150—Consumer Textiles	..	3
APDS 103—Design III—Three-Dimensional Design	3	..
APDS 237—Photography	..	2
HSAD 246—Materials of Interior Design	..	3
APDS 210—Presentation Techniques	3	..
Total	17-18	15

Typical Junior Year		
History Requirement	3	..
PHIL 330—Philosophy of Art	..	3
TEXT 463—History of Textiles	..	3
HSAD 340—Period Homes and Their Furnishings	3	..
HSAD 342—Space Development	3	..
HSAD 343—Interior Design I	..	3
Supporting Electives	3	6
ARTH 261	3	..
Total	15	15

Typical Senior Year		
Science Requirement	3	..
HSAD 341—Contemporary Developments in Architecture, Interiors, Furnishings	..	3
HSAD 344—Interior Design II	3	..
HSAD 345—Professional Aspects of Interior Design	..	3
HSAD 440—Interior Design III	..	4
HSAD 441—Interior Design IV	..	4
Supporting Electives	3	..
Free Electives	5-6	..
Total	15-14	14

Course Code Prefixes—APDS, CRAF, HSAD

INDUSTRIAL EDUCATION

Faculty: Lowell D. Anderson, Charles J. Beatty, Clifton Campbell, Robert C. Cooksey, Edmund D. Crosby, Robert J. Gelina, Perry R. Gemmill, Karl E. Gettle, Paul E. Harrison, Kenneth W. Hastings, Dennis R. Herschbach, Sheldon J. Lloyd, Joseph F. Luetkemeyer, Donald Maley, Walter Mietus, Charles S. Richman, Walter K. Rickert, Kenneth F. Stough, William F. Tierney, Peter J. Vorac, Edward H. White.

The Department of Industrial Education offers programs leading to teacher certification in industrial arts and vocational-industrial education. It also offers a program in education for industry which prepares individuals for supervisory and industrial management positions, and an industrial technology program for persons with advanced technical preparation who wish to teach in technical institutes or junior colleges.

Three curricula are administered by the Industrial Education Department: (1) Vocational-Industrial Education, (2) Industrial Arts Education and (3) Education for Industry. The overall offering includes both undergraduate and graduate programs leading to the degrees of: Bachelor of Science, Master of Education, Master of Arts, Doctor of Education, and Doctor of Philosophy.

The vocational-industrial curriculum may lead either to certification as a vocational-industrial teacher with no degree involved or to a Bachelor of Science degree, including certification. The Uni-

versity of Maryland is designated as the institution which shall offer the "Trade and Industrial" certification courses and hence the courses which are offered are those required for certification in Maryland. The vocational-industrial curriculum requires trade competence as specified by the *Maryland State Plan for Vocational Education*. A person who aspires to be certified should review the State plan and may well contact Maryland State Department of Education officials. If the person has in mind teaching in a designated city or county, he may discuss his plans with the vocational-industrial official of that city or county inasmuch as there are variations in employments and training procedures.

The Industrial Arts Education curriculum prepares persons to teach industrial arts at the secondary school level. It is a four-year program leading to a Bachelor of Science degree. While trade or industrial experience contributes significantly to the background of the industrial arts teacher, previous work experience is not a condition of entrance into this curriculum. Students who are enrolled in the curriculum are encouraged to obtain work in industry during the summer months. Industrial arts as a secondary school subject area is a part of the general education program characterized by extensive laboratory experiences.

	Semester I	Semester II
Freshman Year		
ENGL 101—Composition or alternate	3	..
English Literature or World Literature	..	3
SOCY 100—Introduction to Sociology or PSYC 100—Introduction to Psychology	3	..
Physical Education	(1)	(1)
SPCH 100—Public Speaking	3	..
EDIN 101—Mechanical Drawing I	2	..
EDIN 102—Woodworking I	3	..
EDIN 112—Shop Calculation	..	3
ART—Art elective or	..	..
PHIL—Philosophy elective	..	3
HLTH 105—Science and Theory of Health	..	(2)
EDIN 121—Mechnical Drawing II	..	2
EDIN 122—Woodworking II	..	3
Total	15	17
Sophomore Year		
English Literature or World Literature	3	..
HIST 221—History of U.S. to 1865, or	..	..
HIST 222—History of U.S. since 1865	3	..
HIST—History elective	..	3
PHYS 111 and PHYS 112—Elements of Physics: Mechanics, Heat and Sound	3	3
EDIN 127—Electricity—Electronics I	3	..
EDIN 133—Automotives I	3	..
EDIN 241—Architectural Drawing	2	..
MATH 110—Introduction to Mathematics	..	3
EDIN 247—Electricity—Electronics II	..	3
EDIN 223—Arc and Gas Welding	..	1
EDIN 210—Foundry	..	1
Total	17	14
Junior Year		
CHEM 103, 104—General Chemistry	4	4
EDUC 300—Human Development and Learning	6	..
ECON 205—Fundamentals of Economics	..	3
EDIN 262—Machine Shop Practice I	3	..
EDIN 226—General Metal Work	..	3
EDIN 311—Laboratory Practicum in Industrial Arts		3
EDIN 134—Graphic Arts I		3
Elective (Laboratory)	4	
Elective (Unspecified)		3
Total	17	19
Senior Year		
EDIN 340—Curriculum, Instruction and Observation	3	.
EDIN 347—Student Teaching in Secondary Schools	8	..
EDSE 330—Principles and Methods of Secondary Education	3	.
EDIN 464—Laboratory Organization and Management		3
EDIN 466—Educational Foundation of Industrial Arts		3
EDUC 301—Foundations of Education		3
EDUC—Electives	..	6
Electives (Unspecified)	..	2
Total	14	17

VOCATIONAL-INDUSTRIAL EDUCATION

The vocational-industrial curriculum is a four-year program of studies leading to a Bachelor of Science degree in education. It is intended to develop the necessary competencies for the effective performance of the tasks of a vocational teacher. In addition to establishing the adequacy of the student's skills in a particular trade and the development of instructional efficiency, the curriculum aims at the professional and cultural development of the individual. Courses are included which would enrich the person's scientific, economic, psychological and sociological understandings. The vocational-certification courses for the State of Maryland are a part of the curriculum requirements.

Persons pursuing this curriculum must present documentary evidence of having an apprenticeship or comparable learning period and journeyman experience. This evidence of background and training is necessary in order that the trade examination phase of the curriculum may be accomplished.

Persons having completed the necessary certification courses prior to working on the degree program may use such courses toward meeting graduation requirements. However, after certification course requirements have been met, persons continuing studies toward a degree must take courses in line with the curriculum plan and University regulations. For example, junior level courses cannot be taken until the student has reached full junior standing.

	Semester I	Semester II
Freshman Year		
ENGL 101—Composition or alternate	3	..
English Literature	..	3
SOCY 100—Introduction to Sociology	3	..
SPCH 100—Public Speaking	3	..
ECON 205—Fundamentals of Economics	..	3
EDIN 112—Shop Calculation	3	..

MATH 110—Introduction to Mathematics or MATH 105—Fundamentals of Mathematics		3
Physical Education	(1)	(1)
HLTH 105—Science and Theory of Health		(2)
Total	13	12
Sophomore Year		
ENGL 201—World Literature or Engish Literature	3	
ART—Art elective or PHIL—Philosophy elective		3
HIST 221—History of the U.S. to 1865, or HIST 222—History of the U.S. since 1865	3	
HIST—History elective		3
Physical Sciences	3	3
PSYC 100—Introduction to Psychology	3	
CHEM 103—General Chemistry or ZOOL 101—General Zoology		4
Total	12	13
Trade Examination		20
Junior Year		
EDIN 450—Training Aids Development		3
EDIN 465—Modern Industry	3	
EDUC 300—Human Development and Learning	6	
EDIN 462—Occupational Analysis and Course Construction	3	
CHEM 104 or BOTN 101	4	
EDIN 471—History and Principles of Vocational Education		3
EDIN 457—Tests and Measurements		3
Approved electives		3
Total	16	12
Senior Year		
EDIN 340—Curriculum, Instruction and Observation	3	
EDSE 330—Principles and Methods of Sec. Ed.	3	
EDIN 347—Student Teaching in Secondary Schools*	8	
EDCP 410—Introduction to Counseling and Personnel Services	3	
Electives		6
EDUC 301—Social Foundations of Education		3
EDIN 464—Laboratory Organization and Management		3
Ed. electives		3
Total	17	15

*Student Teaching Requirement in Vocational Education.

Persons currently teaching in the secondary schools with three or more years of satisfactory experience at that level are not required to take EDIN 347—Student Teaching in Secondary Schools. Evidence of satisfactory teaching experience shall be presented in the form of written statements from the principal area supervisor and department head in the school where such teaching is done. Instead of the eight credits required for student teaching, the individual meeting the above qualifications will have eight additional semester hours of elective credits.

ELECTIVE CREDITS

Courses in history and philosophy of education, sociology, speech, psychology, economics, business administration and other areas may be taken with the permission of the student's advisor.

Elective courses in the technical area (shop and drawing) will be limited to courses and subjects not covered in the trade training experience. Courses dealing with advanced technology and recent improvements in field practices will be acceptable.

VOCATIONAL-INDUSTRIAL CERTIFICATION

A person to become certified as a trade industrial and service occupations teacher in the State of Maryland must successfully complete 18 credit hours of instruction.

The following courses must be included in the 18 credit hours of instruction:

EDIN 350—Methods of Teaching
EDIN 464—Laboratory Organization and Management
EDIN 457—Tests and Measurements
EDIN 462—Occupational Analysis and Course Construction

The remainder of the credit hours shall be met through the election of the following courses:

EDIN 450—Training Aids Development
EDIN 461—Principles of Vocational Guidance
EDIN 465—Modern Industry
EDIN 467—Problems in Occupational Education
EDIN 471—History and Principles of Vocational Education
EDCP 410—Introduction to Counseling and Personnel Services
EDCP 411—Mental Hygiene in the Classroom
Educational Psychology or its equivalent

A person in Vocational-Industrial Education may use his certification courses toward a Bachelor of Science degree. In doing so the general requirements of the University and his college must be met. A maximum of 20 semester hours of credit may be earned through examination in the trade in which the student has competence. Prior to taking the examination, the student shall provide documentary evidence of his apprenticeship or learning period and journeyman experience. For further information about credit by examination refer to the *academic regulations*.

EDUCATION FOR INDUSTRY

The Education for Industry curriculum is a four-year program leading to a Bachelor of Science degree. The purpose of the program is to prepare persons for jobs within industry and, as such, it embraces four major areas of competence: (a) technical competence, (b) human relations and leadership competence, (c) communications competence, and (d) social and civic competence.

	Semester I	Semester II
Freshmen Year		
ENGL 101—Composition or alternate	3	
English Literature		3
SOCY 100 or ANTH 100—Introduction to Sociology or Introduction to Anthropology	3	
EDIN 101—Mechanical Drawing I	2	
EDIN 112—Shop Calculation	3	
EDIN 121—Mechanical Drawing II		2
EDIN 122—Woodworking II	3	
EDIN 223—Arc and Gas Welding		1
EDIN 262—Machine Shop Practice I		3

EDIN 210—Foundry		1
Physical Education	(1)	(1)
MATH 110—Introduction to Mathematics		3
Total	15	14
Sophomore Year		
ART—Art Elective		3
English Literature	3	
EDIN 124—Sheet Metal Work	2	
BSAD 110—Elements of Business Enterprise	3	
SPCH 107—Public Speaking		2
PHYS 111, 112—Elements of Physics: Mechanics, Heat and Sound or Elements of Physics: Magnetism, Electricity, and Optics or PHYS 121, 122—Fundamentals of Physics	3 or 4	3 or 4
MATH 111—Introduction to Mathematics	3	
HLTH 105—Science and Theory of Health		(2)
HIST 242—Western Civilization		3
ECON 205—Fundamentals of Economics		3
EDIN 184—Organized and Supervised Work Experience	3	
Total	17 or 18	16 or 17
Junior Year		
History Elective	3	
PSYC 100—Introduction to Psychology	3	
PSYC 235—Personality and Adjustment		3
CHEM 103, 104—General Chemistry	4	4
ECON 470—Labor Economics	3	
EDIN 324—Organized and Supervised Work Experience	3	
EDIN 443-444—Industrial Safety Education I and II	2	2
BSAD 360—Personnel Management I		3
SOCY 462—Industrial Sociology		3
Electives		3
Total	18	18
Senior Year		
BSAD 460—Personnel Management II or BSAD 230—Business I	3	
BSAD 362—Labor Relations	3	
BSAD 385—Production Management		3
EDIN 465—Modern Industry	3	
EDIN 425—Industrial Training in Industry I or EDIN 475—Recent Technological Developments in Products and Processes		3
PSYC 365—Industrial Psychology		3
Electives	5	7
Total	14	16

Course Code Prefix—EDIN

INFORMATION SYSTEMS MANAGEMENT PROGRAM

Chairman: Courtright.
Professor: Patrick.
Associate Professor: Courtright.
Assistant Professors: Sayani, Testa.
Instructors: Chappell, Deutsch, Smith.
Lecturers: Fishman, Golding.

The program of studies in information systems management is designed to meet the needs of those wishing to concentrate on the application of the digital computer to the analysis, design and administration of complex information systems. Students who expect to enter business administration, public administration or organizations in other fields will find that this program offers a relevant preparation.

The student entering this program will place emphasis on the study of digital computer applications and relevant mathematical methods. With the aid of a faculty advisor, he will select a minimum of 15 hours of course work in a secondary field such as business administration, computer science, economics, mathematics, psychology, public administration, or the sciences.

INFORMATION SYSTEMS MANAGEMENT CURRICULUM

	Semester I	Semester II
Freshman Year		
ENGL 101—Composition	3	
ENGL 201 (or 211 or 212 or 221 or 222)—Literature		3
MATH 140, 141—Analysis I, II	4	4
SPCH 100—Public Speaking	3	
Fine Arts and Philosophy Elective		3
Science (one biological and one physical)	3-4	3-4
HLTH 105—Science and Theory of Health		(2)
Physical Education	(1)	(1)
History	3	
	17-18	16-17
Sophomore Year		
BSAD 220, 221—Principles of Accounting	3	3
ECON 201, 203—Principles of Economics	3	3
ENGL 202 (or 211 or 212 or 221 or 222)—Literature	3	
PSYC 100—Introduction to Psychology		3
*MATH 240—Linear Algebra	4	
CMSC 103 or 110—Introductory Algorithmic Methods or Elementary Algorithmic Analysis		3
History	3	
BSAD 230—Business Statistics I		3
	16	15
Junior Year		
IFSM 401—Electronic Data Processing	3	
IFSM 402—Electronic Data Processing Applications		3
BSAD 434—Operations Research I	3	
BSAD 435—Operations Research II		3
BSAD 430—Linear Statistical Models in Business		3
ECON 401, 403, 430, or 440 (any two)	3	3
Secondary Field	3	3
Elective	3	
	15	15
Senior Year		
IFSM 410—Information Processing Problems of Models of Administrative, Economic, and Political Systems	3	
IFSM 436—Introduction to Systems Analysis		3
IFSM 420—Information Processing and Computational Problems in Operations Analysis		3
BSAD 438—Topics in Statistical Analysis for Business and Management	3	
Secondary Field	6	3
Electives	3	6
	15	15

* May be used for upper division credit.
Course Code Prefix—IFSM

JAPANESE LANGUAGE OFFERING

Instructor: Higuchi.

Three semesters of Japanese are now offered under the administration of the Committee on

East Asian Studies. The courses are open to all students interested in Japanese and East Asian studies.

Course Code—JAPN

COLLEGE OF JOURNALISM

Professor and Dean: Hiebert.
Professors: Bryan, Crowell, Martin, Newsom.
Associate Professors: Brown, Grunig.
Assistant Professors: Flippen, Lee, Petrick.
Visiting Assistant Professor: Hoyt.
Instructor: Arkin.
Lecturers: Collier (PT), Dawson (PT), Geraci, Hoy (PT), Hymes (PT).

REQUIREMENTS FOR THE JOURNALISM MAJOR

Listed below are lower-division and upper-division requirements for majors in the College of Journalism. In qualifying for the degree, the student must complete 120 semester hours, 57 hours of which must be upper-division credit.

Course substitutions may be made by the faculty advisor to take account of previous professional experience and to develop programs to include special study. Within the broad outlines of the upper-division courses themselves, students are encouraged to develop individual interest by careful choice of elective courses.

Lower-Division Curriculum

Freshman Year	Semester I	Semester II
ENGL 101 (or 171) and 201	3	3
Science (one course of which must be lab)	4	3
Foreign Language	3	3
PSYC 100 and SOCY 100	3	3
SPCH 100	3	
MATH 110		3
HLTH 105*		(2)
Physical Activities*	(1)	(1)
Total	17	18

*The required HLTH 105 and PHED credits are not applied to the minimum of 120 needed for graduation.

Sophomore Year	Semester I	Semester II
JOUR 200 and JOUR 201	3	3
ENGL 202	3	
Foreign Language	3	3
History	3	3
GVPT 170 and ECON 205	3	3
Fine Arts elective	..	3
Total	15	15

Upper-Division Curriculum

Journalism Requirements

24 credit hours in upper division journalism courses, including Journalism 310, News Editing. At least six credit hours should be taken in one of the following sequences for depth in a special field of journalism:

JOUR 320 and 321—News Editorial.
JOUR 330 and 331—Public Relations.
JOUR 340 and 341—Advertising.
JOUR 350 and 351—News Photography.
JOUR 360 and 361—News Broadcasting.

All journalism majors should elect at least six credit hours from the following courses for breadth in mass communication:

JOUR 400—Law of Mass Communication.
JOUR 410—History of Mass Comunication.
JOUR 420—Government and Mass Communication.
JOUR 430—Comparative Mass Communication Systems.
JOUR 440—Public Opinion and Mass Communication.

Non-Journalism Requirements

12-18 credit hours in upper-division courses in one subject outside of the Journalism Department.

12-18 credit hours of upper-division, non-journalism electives, to be spread or concentrated according to individual needs.

Minimum upper-division credits for graduation	57
Total Lower and Upper-Division	120*

Course Code Prefix—JOUR

LIBRARY SCIENCE EDUCATION CURRICULUM

Faculty: M. Lucia James, Jean Kennelly, W. Bernard Lukenbill.

All students anticipating work in library science education should consult with advisors in this area at the beginning of the freshman year. Students enrolled in this curriculum will pursue a Bachelor or Arts degree with an area of concentration of 36 hours in one of the following: humanities, social sciences, science, or foreign languages. Students may concentrate in a subject area subsumed under one of these four fields, or they may choose a broad spectrum of courses in one of the four areas under the guidance of their advisors. The minor of 18 hours will be library science education.

All students who pursue a degree in library science education are required to complete two years (12 semester hours) of the same foreign language on the college level, or the equivalent. Students who have studied French, German or Spanish for two or more years in high school are required to take the Foreign Language Placement Examination before they continue their study of the language concerned. Students who are placed by the examination in French, German or Spanish 114 (the third college semester) are required to take six additional hours of that language. Students who are placed in French, German or Spanish 115 (the fourth college semester) are required to take three additional hours of that language. Students who are placed in French or Spanish or German 221 (the fifth college semester) are not required to take any further courses in that language. Students who have studied languages other than French, German or Spanish, or who have lived for two or more years in a foreign country where a language other than English prevails,

shall be placed by the chairman of the respective language section, if feasible, or by the Chairman of the Department of Foreign Languages. Native speakers of a foreign language shall satisfy the foreign language requirement by taking 12 hours of English.

Students in library science education will complete eight semester hours in Directed Library Experience as their student teaching requirement. It will involve a half day in school, five days per week, for 16 weeks. This period will be divided into two sections, with eight weeks spent in an elementary school and eight weeks in a secondary school. A concurrent weekly seminar will also be a part of this experience. Students completing this curriculum will be eligible for certification as elementary or secondary school librarians.

	Semester I	Semester II
Freshman Year		
ENGL 101—Composition or alternate	3	..
English Literature	..	3
Social Science (Economics, Geography, Government and Politics, Sociology, Psychology, or Anthropology)	3	3
Physical Education	(1)	(1)
Art Music, or Philosophy	3	..
MATH 105—Fundamentals of Mathematics	..	4
Science	3	..
Science (with laboratory)	..	4
Foreign Language, or elective if Advanced Placement	3	3
Total	16	18
Sophomore Year		
SPCH 100—Public Speaking	3	..
English Literature	3	..
History requirements	3	3
Foreign Language, or elective if Advanced Placement	3	3
HLTH 105—Science and Theory of Health	..	(2)
Area of concentration	6	9
Total	18	17
Junior Year		
EDUC 300—Human Development and Learning	6	..
EDUC 370—Introduction to Librarianship	3	..
EDUC 371—Basic Reference and Information Sources	3	..
EDUC 372—Cataloging and Classification of Library Materials	..	3
EDUC 373—Library Materials for Children	..	
Area of concentration	3	6
Electives	3	6
Total	18	18
Senior Year		
EDUC 301—Foundations of Education	3	..
EDUC 374—Library Materials for Youth	..	3
EDUC 375—School Library Administration and Service	3	..
EDEL 334—Directed Library Experience in Elementary Schools with Seminar and EDSE 371, Directed Library Experience in Secondary Schools with Seminar (4 each)	..	8
Area of concentration	6	6
Electives	6	..
Total	18	17

Course Code Prefix—EDUC

LINGUISTICS PROGRAM

Associate Professor and Director: Dingwall.
Assistant Professor: Fidelholtz.

The program in linguistics is designed to provide students with a comprehensive and consistent view of the accomplishments, methodology and problems of modern linguistic science which has as its aim the explication of the facts of specific natural languages as well as of natural language in general. While any educated man will benefit from an understanding of the structure and development of language, those who expect to become scholars and teachers of anthropology, English, foreign languages, philosophy, psychology, or speech will find a background in linguistics invaluable. Although there is not an undergraduate major in linguistics at this time, courses in linguistics may be used to fulfill the supporting course requirements in some programs leading to the B.A. or B.S. degree.

Course Code Prefix—LING

MATERIALS RESEARCH

Director: Lippincott.
Associate Director: Brasch.
Advisory Committee: Castellan, ex officio representative of the Office of the Vice Chancellor for Academic Affairs, Ginter (Institute for Molecular Physics), Gordon (Chemistry), Lin (Electrical Engineering), Minkiewicz (Physics and Astronomy), Marcinkowski (Mechanical Engineering), Silverman (Chemical Engineering).

The Center of Materials Research is an interdepartmental organization which has as its function the support of graduate research and education in the field of materials sciences. This support consists of funds for the support of graduate students working towards advanced degrees, postdoctoral research appointments, the granting of research support to university faculty working in the materials sciences and the purchases of capital equipment needs for graduate students or faculty research programs. It also operates service and research facilities which are shared jointly by graduate students and faculty from several departments.

The scientific management of this program rests solely within the University through the Director of the Center of Materials Research, aided by an associate director and an Advisory Committee. Faculty participating in the program represent the following departments: Chemical Engineering, Chemistry, Electrical Engineering, Horticulture, Mechanical Engineering, Molecular Physics, and Physics.

Funds for the Center come from both university and government sources, the largest single source being the National Science Foundation. Individual faculty members obtain NSF support for their re-

search when their proposals to the Center of Materials Research are approved by the CMR Committee and the Director. The nation's industry and defense needs have created a great demand for detailed knowledge of materials and their properties; for example, basic research in materials sciences is important if one is to prevent failure of material components in anything from relatively simple automobile or airplane parts or a biomaterials component associated with a kidney transplant. The university thus has a role in educating students for advanced degrees, both in research and in training, who have both the knowledge and the expertise to work with and use the sophisticated materials now so commonplace in our modern technology.

Areas of research activity include high pressure phenomena; intermolecular interactions; spectra and structural studies; electronic and mechanical properties of materials; electronic structure and fundamental interactions in solids, interaction of radiation with materials; mechanical properties such as defect and dislocation phenomena, and characterization of materials; neutron scattering and diffraction; metallurgy and materials properties of polymers.

The program is interdisciplinary in nature since it cuts across the normal departmental lines to bring many disciplines to bear on the complex nature of many materials problems.

The CMR provides central facilities containing the most modern available instrumentation for use by participating members of the Center. The facilities include: X-Ray Photo-Electron Spectroscopy; Electron Microscope; X-Ray; Molecular Spectroscopy; Sample Preparation; Coordinated Laser; Crystal Growth; Mechanical Testing; High Field Superconducting Magnet; and Special Techniques and Instrumentation.

MATHEMATICS

Professor and Chairman: Goldhaber.

Professors: Adams, Antman, Auslander, Brace, Chu, Cohen, Correl, Douglis, Edmundson,* Ehrlich, Goldberg, Goldstein, Good, Gray, L. Greenberg, Horvath, Hummel, Jackson, Kirwan, Kleppner, Kubota, Lehner, Maltese, Mikulski, Ortega,*** Pearl, Reinhart, Rheinboldt,* Schaefer, Stellmacher, Strauss, Syski, Vesentini, Zedek.

Associate Professors: Benedetto, Berg, Bernstein, Cook, Cooper, Dancis, Ellis, Fey,** Green, Gulick, Henkelman,** Johnson, Lay, Lipsman, Lopez-Escobar, Markley, Neri, Osborn, Owings, Sather, Schafer, Schneider, Warner, Wolfe, Zalcman.

Assistant Professors: Alexander, Anderson, Currier, Davidson,** Fay, Fields, R. Greenberg, Halperin, Haris, Helzer, Hemperly, W. Hill, Mucci, Niebur, Powell, Schmidt, Shepherd, Smith, Sweet, Unsain, Yang.

Instructors: Brown, Chernick, Kastner, Kilbourn, Lepson, McClay, Meyers, Sorensen, Steely, Wagner.

Faculty Research Assistant: R. Hill.

The program in mathematics leading to the degree of Bachelor of Science in Mathematics offers students training in mathematics in preparation for graduate work, teaching and positions in government or industry.

A student intending to major in mathematics should complete the introductory sequence MATH 140, 141, 240, 241 or the corresponding honors sequence MATH 150, 151, 250, 251 and should have an average grade of at least B in these courses.

A mathematics major is required to complete with at least a grade of C MATH 403, 410, 411, and one of MATH 240, 400, 405. A total of eight upper division courses (24 credits) in mathematics or statistics with a grade of at least C is required.

The requirements are detailed in a departmental brochure which is available through the Undergraduate Mathematics Office. Appropriate courses taken at other universities or through University College may be used to fulfill these requirements. but at least four of the eight required upper division mathematics courses must be taken in the Department of Mathematics.

In addition to the above, a mathematics major must include at least 22 credit hours of supporting course work; ten specified credit hours of science and twelve specified credit hours of other supporting course work (which need not be in science) are required. These requirements can be met in various ways; for details, the mathematics departmental brochure for majors should be consulted.

Since most of the non-English mathematical literature is written in French, German or Russian, students intending to continue studying mathematics in graduate school should obtain a reading knowledge of at least one of these languages.

HONORS IN MATHEMATICS

The Mathematics Honors Program is designed for students showing exceptional ability and interest in mathematics. Its aim is to give a student the best possible mathematical education. Participants are selected by the Departmental Honors Committee during the first semester of their junior year. To graduate with honors in mathematics they must take four credits of MATH 398 and pass a final written and oral comprehensive examination. A graduate course or three credits of independent study may be substituted for two credits of MATH 398. The rest of the program is flexible. Independent work is encouraged and can be done in place of formal course work. A student need not major in mathematics to participate in the honors program.

The Mathematics Department also offers a spe-

* Joint Appointment: Computer Science Center.
** Joint Appointment Department of Secondary Educetion.
*** Joint Appointment: Computer Science Center and IFDAM.

cial Mathematics Departmental honors calculus sequence (MATH 150, 151, 250, 251) for promising freshmen with a strong mathematical background (usually including calculus). Enrollment in the sequence is normally by invitation but any interested student may apply to the Mathematics Departmental Honors Committee for admission.

Participants in the General Honors Program may enroll in special honors sections of the regular calculus sequence (MATH 140H, 141H, 240H, 241H). They may enroll in the honors calculus sequence if invited by the Mathematics Departmental Honors Committee. However, the Mathematics Departmental Honors calculus sequence and the General Honors Program are distinct, and enrollment in one does not imply acceptance in the other.

Neither honors calculus sequence is prerequisite for participating in the Mathematics Honors Program, and students in these sequences need not be mathematics majors.

PI MU EPSILON

The local chapter of Pi Mu Epsilon, national honorary mathematics fraternity, meets frequently to discuss mathematical or educational topics of interest to undergraduates. The programs are open to the public.

PLACEMENT IN MATHEMATICS COURSES

The department has a large offering to accommodate a great variety of backgrounds, interests and abilities. The department permits a student to take any course for which he has the appropriate background regardless of formal course work. For example, a student with a high school calculus course may be permitted to begin in the middle of the calculus sequence even if he does not have advanced standing. Students may obtain undergraduate credit for mathematics courses in any of the following ways: passing the appropriate CEEB Advanced Placement examination, passing standardized CLEP examinations, and through the department's Credit-by Examination. Students are urged to consult with advisors from the Mathematics Department to assist with proper placements.

Course Code Prefixes—MATH, STAT

MEASUREMENT AND STATISTICS

Faculty: C. Mitchell Dayton, John F. Giblette, Charles E. Johnson, George B. Macready, Bruce G. Rogers, William D. Schafer, William Sedlacek, Clayton L. Stunkard.

For Advanced Undergraduates and Graduates

Programs available in the Department of Measurement and Statistics lead to the master of arts degree (thesis or non-thesis option) and to the doctor of philosophy degree. In addition to the general master's degree, three specialist programs are available: evaluation specialist, statistical analysis specialist, and measurement specialist. Potential job placements include: evaluators of various projects in curriculum offices in state or county school systems; federal projects; government statistical positions, private research organizations; testing specialists in government, state and local school systems, and private test construction organizations. The doctoral program is intended to produce persons qualified to: teach at the college level in the field of educational measurement and research methodology; conduct research studies in the field of education; advise in the conduct of research studies; and administer programs in the above areas.

Persons interested in majoring in the Department must display above average aptitude and interest in quantitative methods as applied in the behavioral sciences.

Course Code Prefix—EDMS

MECHANICAL ENGINEERING

Professor and Chairman: Dally.
Professors: Allen, Armstrong, Asimow, Berger, Cunniff, Hsu, Jackson, Marcinkowski, Sayre, Shreeve, Talaat, Weske (Emeritus), Wockenfuss, Yang.
Associate Professors: Anand, Buckley, Hayleck, Fourney, Marks, Morse, Sallet, Walston.
Assistant Professors: Elkins, Forsnes, Holloway, Kirk, Kobayashi, Owens, Sargent, Scheffler, Tsui.
Instructors: Becker, Puckett, Hagner, Whitbeck.
Lecturers: Dawson, Seigel.
Visiting Professor: Irwin.

The primary function of the mechanical engineer is to create devices, machines, structures or processes which are used to advance the welfare of mankind. Design, analysis and testing are the essential steps in these developments. Of particular importance are the aspects of engineering science and art relating to the generation and transmission of mechanical power, the establishment of both experimental and theoretical models of mechanical systems, the static and dynamic behavior of fluids and the optimization of materials in design. Emphasis is also given to the proper co-ordination and management of facilities and personnel to achieve a successful product or service.

The responsibility of the Mechanical Engineering profession is extremely broad. The following divisions of the American Society of Mechanical Engineers indicate many of the technical areas in which the mechanical engineer may work: air pollution, applied mechanics, automatic controls, aviation and space, biomechanical and human factors, design engineering, diesel and gas engine power, energetics, fluids engineering, fuels, gas turbine, heat transfer, management, materials

handling, metals engineering, nuclear engineering, petroleum, power, pressure vessels and piping, process industries, railroad, rubber and plastics, safety, solar energy, textiles and underwater technology.

There are many career opportunities in all of these fields. In particular, the areas of design, systems analysis, management, consulting, research, maintenance, production, teaching and sales offer challenging and rewarding futures.

Because of the wide variety of professional opportunities available to the mechanical engineer, the curriculum is designed to provide the student with a thorough training in basic fundamentals including physics, chemistry, mathematics, mecnanics, thermodynamics, materials, heat transfer, electronics, power and design. The curriculum leads to a Bachelor of Science degree in Mechanical Engineering which is usually sufficient for early career opportunities in industry or the government. Advanced graduate programs are available for continued study leading to Master of Science and Doctor of Philosophy degrees.

MECHANICAL ENGINEERING CURRICULUM

BASIC FRESHMAN YEAR

Course	Semester I	II
HLTH 105—Science and Theory of Health	(2)	..
CHEM 103, 104—General Chemistry**	4	4
PHYS 161—General Physics	..	3
MATH 140, 141—Analysis I, II	4	4
ENES 101—Intro Engr. Science	3	..
ENES 110—Mechanics	..	3
General Education Courses	3	3
Physical Activities	(1)	(1)
Total Credits	17	18

Students who are not prepared to schedule MATH 140 are advised to schedule MATH 115 (3 cr.) and ENGL 101 (3 cr.) in the Summer Session before the fall (first) Semester. MATH 115 does not count toward fulfilling the requirements of an engineering degree . . . . . it is a preparatory course. Otherwise, students will schedule their freshman years as showing in the following:

ALTERNATE FRESHMAN YEAR

Course	Semester I	II	Summer
HLTH 105—Science and Theory of Health	(2)		
CHEM 103, 104—General Chemistry**	4	4	
PHYS 161—General Physics			3
MATH 115—Intro to Analysis***	3		
MATH 140, 141—Analysis I, II		4	4
ENES 101—Intro. Engr. Science	3		
ENES 110—Mechanics		3	
General Education Courses	3	6	
Physical Activities	(1)	(1)	
Total Credits	16	18	7

**Qualified students may elect to take CHEM 105 and 106 (4 cr. hrs. each) instead of CHEM 103 and 104.

***MATH 115 is an additional course for those students who do not qualify to begin with MATH 140.

	Semester I	II
SOPHOMORE YEAR		
General Education Courses	3	3
MATH 241—Analysis III	4	
MATH 246—Differential Equations		3
PHYS 262,263—General Physics	4	4
ENES 220—Mechanics of Materials	3	
ENES 221—Dynamics		3
ENME 200—Introduction to Mechanical Engineering	3	
ENME 216—Thermodynamics I		3
Total	17	16
JUNIOR YEAR		
General Education Courses	3	3
ENEE 300—Principles of Electrical Engineering	3	
ENEE 301—Electrical Engr. Lab.	1	
ENME 300—Materials Engineering		3
ENME 301—Materials Engr. Lab.		1
ENME 321—Transfer Processes		3
ENME 342—Fluid Mechanics I	3	
ENME 343—Fluid Mechanics Lab.	1	
ENME 360—Dynamics of Machinery	3	
ENME 381—Measurements Laboratory		3
ENME 382—Engr. Anal. and Computer Programming	3	
Technical Elective		3*
Total	17	16
SENIOR YEAR		
General Education Courses	3	3
ENME 400—Machine Design	3	
ENME 401—Mechanical Engineering Analysis and Design		4
ENME 421—Energy Conversion I	3	
ENME 480—Engineering Experimentation		3
Technical Elective	6*	6*
Total	15	16

*Except with the special permission of the Department Chairman, the student will be required to take 9 of the elective credits in the Engineering College, 6 of which must be in the Mechanical Engineering Department.

Technical Electives

ENME 341—Gas Dynamics	3
ENME 380—Applied Mathematics in Eng.	3
ENME 402—Selected Topics in Engr. Design	3
ENME 403—Automatic Controls	3
ENME 410—Operations Research I	3
ENME 411—Introduction to Industrial Engineering	3
ENME 422—Energy Conversion II	3
ENME 423—Environmental Engineering	3
ENME 424—Advanced Thermodynamics	3
ENME 442—Fluid Mechanics II	3
ENME 450—Mechanical Engineering Analysis for the Oceanic Environment	3
ENME 451—Mechanical Engineering Systems for Underwater Operations	3
ENME 452—Physical and Dynamical Oceanography	3
ENME 453—Ocean Waves, Tides and Turbulences	3
ENME 460—Elasticity and Plasticity I	3
ENME 461—Dynamics II	3
ENME 462—Introduction to Engineering Acoustics	3
ENME 463—Mechanical Engineering Analysis	3
ENME 465—Introductory Fracture Mechanics	3
ENME 481—Engineering Experimentation	3
ENME 488—Special Problems	3
ENME 489—Special Topics in Mechanical Engineering	3

In the Mechanical Engineering Department there are several divisions of specialization which include: design and system analysis, energy conversion, solid and fluid mechanics and materials. The undergraduate student may select technical electives from one or more of these areas of specilization. Students planning to continue on in the graduate program should preferably choose electives to provide the best background for their major area. The subject material of interest to each field of specialization is:

I Industrial and Systems Engineering
- a. Systems design
- b. Systems analysis
- c. Operations research
- d. Engineering management

II Energy
- a. Thermodynamics
- b. Heat transfer
- c. Energy conversion
- d. Propulsion

III Fluid Mechanics
- a. Compressible and incompressible flow
- b. Viscous flow
- c. Hydrodynamics
- d. Marine and ocean engineering

IV Solid Mechanics
- a. Continuum mechanics
- b. Dynamics, vibrations and acoustics
- c. Elasticity, plasticity and viscoelasticity
- d. Plates, shells and structures
- e. Experimental mechanics

V Materials

See listing under Engineering Materials section.

Opportunities are also available for students to take advanced work in engineering management, operations research, marine and ocean engineering, bio-mechanical engineering, environmental engineering, acoustics, bio-mechanics and experimental stress analysis.

Course Code Prefix—ENME

METEOROLOGY PROGRAM

Professor and Director: Landsberg.
Professor: Faller.
Visiting Professor: Fritz.
Associate Professors: Israel,* Rodenhuis.
Assistant Professors: Gage, Thompson, Vernekar.
Instructor: Li.
Visiting Lecturers: Bonner, Gerrity.
Research Associate: Overcamp.
Faculty Research Assistant: Kaylor.

*Joint appointment with civil engineering.

The Program in Meteorology, part of the Institute for Fluid Dynamics and Applied Mathematics, offers a number of courses of interest to undergraduate students.

These courses provide an excellent undergraduate background for those students who wish to do graduate work in the fields of atmospheric and oceanic science, meteorology, air pollution, and other environmental sciences. The interdisciplinary nature of studies in meteorology and oceanography assures that all science oriented students will gain a broadened view of physical science as a whole, as well as the manner in which the more pure sciences may be applied to understand the behavior of our environment.

Course Code Prefix—METO

MICROBIOLOGY

Associate Professor and Chairman: Young.
Professors: Colwell, Doetsch, Faber (Emeritus), Hetrick, Laffer, Pelczar.
Associate Professors: Cook, MacQuillan, Roberson.
Assistant Professors: Vaituzis, Voll, Weiner.
Lecturers: Janicki, Stadtman.

The Department of Microbiology has as its primary aim providing the student with thorough and rigorous training in microbiology. This entails knowledge of the basic concepts of bacterial cytology, physiology, taxonomy, metabolism, and genetics, as well as an understanding of the biology of infectious disease, immunology, general virology, and various applications of microbiological principles to public health and industrial processes. In addition, the department pursues a broad and vigorous program of basic research, and encourages original thought and investigation in the above-mentioned areas.

The department also provides desirable courses for students majoring in allied departments who wish to obtain vital, supplementary information. Every effort has been made to present the subject matter of microbiology as a basic core of material that is pertinent to all biological sciences.

The curriculum outlined below, which leads to a bachelor's degree, includes the basic courses in microbiology and allied fields.

A student planning a major in microbiology should consult his advisor during the first year. The supporting courses should be chosen only from the biological or physical sciences.

No course with a grade less than C may be used to satisfy major requirements.

The department has an Honors Program, and information concerning this program may be obtained from the department.

Twenty-four semester hours of microbiology courses are required. This includes MICB 200—General Microbiology (4), and MICB 440—Pathogenic Microbiology (4). At least sixteen additional semester hours must be taken from: MICB 280—Ecology and Microbial Genetics (3), MICB 290—

Applied Microbiology (4), MICB 300—Microbiological Literature (1), MICB 399—Microbiological Problems (3), MICB 400—Systematic Bacteriology (2), MICB 410—History of Microbiology (1), MICB 420—Epidemiology and Public Health (2), MICB 450—Immunology (4), MICB 460—General Virology (4), MICB 470—Microbial Physiology (4), and MICB 490—Microbial Fermentations (4). Also required as supporting courses are: CHEM 103, 104—College Chemistry I, II (4, 4), CHEM 201, 202—College Chemistry III and College Chemistry Laboratory III (3, 2), CHEM 203, 204—College Chemistry IV and College Chemistry Laboratory IV (3, 2), CHEM 461, 462—Biochemistry (3, 3), MATH 110, 111—Introduction to Mathematics (3, 3) or equivalent, PHYS 121, 122—Fundamentals of Physics (4, 4), ZOOL 101—General Zoology (4), and four additional semester hours of biological sciences. [MATH 220, 221—Introductory Calculus is recommended but not required.]

Course Code Prefix—MICB

MOLECULAR PHYSICS

Professor and Director: Munn.

Professors: Benesch, Benedict.

Associate Professors: Krisher, DeRocco, Sengers, Ginter.

Assistant Professors: Alexander, Gammon.

Research Associates: Covey, Cook.

The Institute for Molecular Physics serves as an ideal place to bring together physicists and chemists to work on problems of mutual interest to the advantage of both. The graduate degree program in chemical physics is administered jointly by the Institute and the Chemistry and Physics Departments.

The current research activities include theoretical and experimental studies in the broad fields of intermolecular forces (equation of state of liquids and gases, critical phenomena, transport phenomena in gases and plasmas, molecular collisions and scattering processes, biological systems), molecular structure (spectroscopy from the microwave to the vacuum ultraviolet, upper atmospheric and auroral phenomena, planetary atmospheres, potential energy curves, molecular quantum mechanics), and chemical and physical kinetics.

Since the faculty of the Institute feels strongly that students should fulfill the undergraduate requirements in one of the traditional departments to insure a broad background in a fundamental subject, no undergraduate degree is offered. Members of the Institute teach both undergraduate and graduate courses in the Department of Chemistry and the Department of Physics and Astronomy and supervise thesis research of graduate students in these departments. The Institute also participates in a graduate degree program in chemical physics which is jointly administered by the Institute, the Department of Chemistry, and the Department of Physics and Astronomy.

MUSIC

Professor and Chairman: Troth.

Professors: Berman, Bernstein, deVermond, Gordon, Grentzer, Heim, Helm, Johnson, Moss, Taylor, Traver, Ulrich (Emeritus).

Associate Professors: Blum, Garvey, Head, Horton, Hudson, McClelland, Meyer, Montgomery, Nossaman, Pennington, Schumacher, Serwer, Shelley, Springmann, True.

Assistant Professors: Davis, Etheridge, Fanos, Fleming, Gallagher, Gould, Haley, Kuhn, Olson, Payerle, Seidler, Skidmore, Wakefield, Wilson.

Instructors: Barnett, Beatty, Heath, Mueller, Roesner, Steinke, Wachhaus.

Visiting Lecturer: Lieberman.

The objectives of the department are (1) to help the general student develop sound critical judgment and discriminating taste in the art of music; (2) to provide professional musical training based on a foundation in the liberal arts; (3) to prepare the student for graduate work in the field; and (4) to prepare him to teach music in the public schools. To this end, two degrees are offered: the Bachelor of Music, with a major in theory and composition, history and literature, or music performance; and the Bachelor of Arts, with a major in music. The Bachelor of Science degree, with a major in music education, is offered in the Departments of Early Childhood-Elementary Education and Secondary Education; course offerings and degree programs are described in the sections relating to these departments. These degree programs, however, are totally administered within the Music Department.

Courses in music theory, literature and music performance are open to all students who have completed the specified prerequisites or their equivalents if teacher time and facilities permit. The University Bands, Chamber Chorus, Chapel Choir, Madrigal Singers, Men's Glee Club, Orchestra, and Women's Chorus, as well as the smaller ensembles, are likewise open to qualified students.

THE BACHELOR OF MUSIC DEGREE

The curriculum leading to the degree of Bachelor of Music is designed for students who wish to prepare for music teaching on the college level. A list of specific courses is available in the departmental office. A grade of C or above is required in each major course. The course requirements in the three major areas may be summarized as follows:

Major in	Theory and Composition sem. hrs.	History and Literature sem. hrs.	Applied Music sem. hrs
Academic Courses:			
Specified*	43	43	43
Unspecified	8	8	9
Theory and Literature:			
Lower Division	27	23	23
Upper Division	16	22	13
Applied Music:	26	24	32

*In addition; eight semester hours in ensemble courses.

THE BACHELOR OF ARTS DEGREE

The curriculum leading to the Bachelor of Arts degree with a major in music is designed for students whose interests are cultural rather than professional. The departmental requirements include nineteen semester hours in music theory, eighteen semester hours in music history and literature, ten semester hours in applied music, in addition to one semester hour of ensemble credit for each semester in residence. A list of specific courses is available in the departmental office. A grade of C or above is required in each major course.

Course Code Prefixes—MUSC, MUED

NATURAL RESOURCES INSTITUTE

Director: Cronin.

The Natural Resources Institute is a multifaceted organization which, through research, education and training, strives to increase man's knowledge and awareness in the field of natural resources. Particular emphasis is on the renewable natural resources of Maryland.

The Institute, part of the University's Division of Life Sciences and Agriculture, often works closely with State and Federal agencies, as well as private conservation groups, conducting scientific research into many different areas of environmental concern.

Institute scientists, researchers and specialists engage in a wide range of projects and studies ranging from probes into pollution and power plant effects on animal life in and around the Chesapeake Bay, to the forest and wildlife problems caused by insects and strip mines in Western Maryland. Some search for better ways to prepare, process and package Bay seafoods, and act as advisors to Maryland's important seafood industries. Others study sewage and mine drainage effects on the State's freshwater lakes and streams.

Environmental education is carried on by the Institute in the form of annual summer resource workshops for school teachers, and research into better was to teach children environmental concepts and awareness through first-hand laboratory experience.

The Institute cooperates with other University Departments in teaching undergraduate and graduate courses in wildlife, zoology and fisheries science. During summer sessions, undergraduate and graduate level classes in estuarine sciences are offered to a limited number of students at the Institute's major research facility, the Chesapeake Biological Laboratory at Solomons, Maryland.

Formerly the State Department of Research and Education, the Natural Resources Institute became a part of the University in 1961. In addition to its facilities in H. J. Patterson Hall on the College Park campus, the Institute has offices and laboratories in four strategic natural-resource areas of the State: the Chesapeake Biological Laboratory (founded at Solomons in 1925, subsequently incorporated into the Institute); Hallowing Point Field Station (a branch of CBL near Prince Frederick); the Seafood Processing Laboratory (Crisfield); and the Western Maryland Center (LaVale).

NUCLEAR ENGINEERING PROGRAM

Professors: Duffey, Johnson, and Silverman.

Associate Professors: Almenas, Munno, and Roush.*

Assistant Professors: Blair and Sheaks.

Part-Time Professor: Goldman.

Lecturer: Belcher.

Course Code Prefix—ENNU

Nuclear engineering deals with the practical use of nuclear energy from nuclear fission, fusion and radioisotope sources. The major use of nuclear energy is in electric power generation. Other uses are in the areas of chemical processing, medicine, instrumentation, and isotope tracer analysis. The nuclear engineer is primarily concerned with the design and operation of energy conversion devices ranging from very large reactors to miniature nuclear batteries, and with the use of nuclear reactions in many environmental, biological and chemical processes. Because of the wide range of uses for nuclear systems, the nuclear engineer finds interesting and diverse career opportunities in a variety of companies and laboratories.

Programs of study in nuclear engineering at the undergraduate and graduate level are offered through the Chemical Engineering Department. Students may use nuclear engineering as a field of concentration in the Bachelor of Science in Engineering program.

Students choosing nuclear engineering as their primary field may pursue the following general curriculum. Students electing nuclear engineering as their secondary field should seek advice from a member of the nuclear engineering faculty.

*Joint appointment with Physics.

BASIC FRESHMAN YEAR

Course No. and Title	Semester I	Semester II
HLTH 105—Science and Theory of Health	(2)	..
CHEM 103, 104—General Chemistry**	4	4
PHYS 161—General Physics	..	3
MATH 140, 141—Analysis I, II	4	4
ENES 101—Intro. Engr. Science	3	..
ENES 110—Mechanics	..	3
General Education Courses	3	3
Physical Activities	(1)	(1)
Total Credits	17	18

Students who are not prepared to schedule MATH 140 are advised to schedule MATH 115 (3 cr.) and ENGL 101 (3 cr.) in the Summer Session before the fall (first) Semester. MATH 115 does not count toward fulfilling the requirements of an engineering degree . . . . it is a preparatory course. Otherwise, students will schedule their freshman year as showing in the following:

ALTERNATE FRESHMAN YEAR

Course No. and Title	I	II	Summer
HELTH 105—Science and Theory of Health	(2)		
CHEM 103, 104—General Chemistry**	4	4	
PHYS 161—General Physics I			3
MATH 115—Intro. to Analysis***	3		
MATH 140, 141—Analysis I, II		4	4
ENES 101—Intro. Engr. Science	3		
ENES 110—Mechanics		3	
General Education Courses	3	6	
Physical Activities	(1)	(1)	
Total Credits	16	18	7

**Qualified students may elect to take CHEM 105 and 106 (4 cr. hrs. each) instead of CHEM 103 and 104.

***MATH 115 is an additional course for those students who do not qualify to begin with MATH 140.

Sophomore Year	Semester I	Semester II
General Education Courses	3	3
MATH 240—Linear Algebra	4	..
MATH 246—Differential Equations	..	3
PHYS 262, 263—General Physics	4	4
ENES 220—Mechanics of Materials	3	..
CMSC 100—Intro. to Use of Computers	1	..
Secondary Field Elective	2	3
ENNU 215—Intro. to Nuc. Tech.	..	3
Total	17	16
Junior Year		
General Education Courses	3	3
ENNU 320—Nuc. Reactor Operation	3	..
ENNU 430—Radioisotope Power Sources	..	3
ENNU 450—Reactor Engr. I	..	3
PHYS 371—Modern Phys. for Engr.	3	..
Secondary Field Courses	3	3
ENES Electives	3	3
Technical Elective	3	..
Total	18	15
Senior Year		
General Education Courses	3	3
ENNU 455—Nuc. React. Engr. II	3	..
ENNU 480—Reactor Core Design	..	3
ENNU Electives	3	6
Secondary Field Courses	3	3
Technical Electives	6	..
Total	18	15

PHILOSOPHY

Acting Chairman: Brown.

Professors: Pasch, Perkins, Schlaretzki.

Associate Professors: Brown, Celarier, Lesher, Martin, Svenonius.

Assistant Professors: Cartwright, Johnson, Kress, Odell, Varnedoe.

Lecturer: Curtis.

The undergraduate course offerings of the Department of Philosophy are, as a group, intended both to satisfy the needs of persons wishing to make philosophy their major field and to provide ample opportunity for other students to explore the subject. In general, the study of philosophy can contribute to the education of the university student by giving him experience in critical and imaginative reflection on fundamental concepts and principles, by acquainting him with some of the philosophical beliefs which have influenced and are influencing his own culture, and by familiarizing him with some classic philosophical writings through careful reading and discussion of them. Courses designed with these objectives primarily in mind are PHIL 100 (Introduction to Philosophy), PHIL 170 (Elementary Logic and Semantics), PHIL 140 (Ethics), PHIL 236 (Philosophy of Religion), and the historical courses 305, 310, 320, 325, and 326.

For students interested particularly in philosophical problems arising within their own special disciplines, a number of appropriate courses are available: PHIL 233 (Philosophy in Literature), PHIL 250 (Philosophy of Science), PHIL 343 (The Conflict of Ideals in Western Civilization), PHIL 360 (Philosophy of Language), PHIL 330 (Philosophy of Art), PHIL 457 (Philosophy of History), PHIL 444 (Political and Social Philosophy), PHIL 450 (Topics in the Philosophy of Science), and PHIL 474 (Induction and Probability).

The departmental requirements for a major in philosophy are as follows: (1) a total of at least 30 hours in philosophy, not including PHIL 100; (2) PHIL 140, 271, 310, 320, 326, and at least two courses numbered 399 and above; (3) a grade of C or better in each course counted toward the fulfillment of the major requirement.

For students of exceptional ability and interest in philosophy, the department offers an honors program. Information regarding this special curriculum may be obtained from the departmental advisors.

The Department presents visiting speakers from this country and abroad in its colloqium series, scheduled throughout the academic year. In addition, members of the department and advanced graduate students lecture on topics of current significance in the Graduate Workshop and in the undergraduate Philosophy Club.

Course Code Prefix—PHIL

PHYSICAL EDUCATION

Professor and Chairman: Husman.
Professors: Clarke, Eyler, Humphrey, Kramer.
Associate Professors: Church, Cronin, Dotson, Ingram, Kelley, Love, Steel.
Assistant Professors: Arrighi, Campbell, Freundschuh, Fringer, Hult, Jackson, Johnson, Kesler, Krouse, McKnight, Santa Maria, Tyler, VanderVelden, Wrenn.
Instructors: Bohren, Drum, Gallagher, Kinnear, Long, McEwan, McHugh, Murray, Reid, Royer, Sigler, Terauds, Youells.

This curriculum prepares students (1) for teaching physical education in the secondary school (2) for coaching and (3) for leadership in youth and adult groups which offer a program of physical activity. The first two years of this curriculum are considered to be an orientation period in which the student has an opportunity to gain an adequate background in general education as well as in those scientific areas closely related to this field of specialization. In addition, emphasis is placed upon the development of skills in a wide range of motor activities. Further, students are encouraged to select related areas, especially in the fields of biology, social science, psychology, health education, and recreation as fields of secondary interest. These materially increase the vocational opportunities which are available to a graduate in physical education.

EQUIPMENT: Students may be required to provide individual equipment for certain courses.

UNIFORMS: Suitable uniforms, as prescribed by the College, are required for the activity classes and for student teaching. These uniforms should be worn only during professional activities.

Men—During the freshman and sophomore years, men will wear red and black T-shirts, black trunks, white socks, gym shoes, supporter, and sweat suit.

Women—Appropriate uniforms, ankle socks, and tennis shoes, and leotard and skirt, and warm-up suit.

For Student Teaching—an appropriate teaching costume will be selected under the guidance of the supervisor of student teaching before the beginning of the junior year.

PHYSICAL EDUCATION CURRICULUM FOR MEN

	Semester I	Semester II
Freshman Year		
ENGL 101—Composition	3	..
Social Science Elective	..	3
MATH (any above Math 001)	3	..
ZOOL 101—General Zoology	..	4
SPCH 107—Public Speaking	2	..
HLTH 140—Personal and Community Health	..	3
PHED 180—Introduction to Physical Education and Health	2	..
PHED 182—Rhythmic Activities	2	..
PHED 185, 187—Skills Laboratory	2	2
PHED 274M—Aquatics	..	2
Electives	3	3
Total	17	17
Sophomore Year		
ENGL 201, 202—World Literature	3	3
ZOOL 201, 202—Human Anatomy and Physiology	4	4
Social Science Elective	3	..
PHED 261M, 263M—Laboratory Skills	2	2
HIST 221 or 222—U.S. History	..	3
Science Group Requirement (Physics 101, 111, or Chemistry 102, 103, or 105)	..	3
HLTH 150—First Aid and Safety	1	..
Electives	5	1
Total	18	16
Junior Year		
HIST	3	..
Fine Arts elective	..	3
PHED 400—Kinesiology	4	..
PHED 305M, 307M—Skills Laboratory	2	2
PHED 493—History and Philosophy of Sport and Physical Education	..	3
PHED 420—Physical Education for the Elementary School	..	3
Theory of Coaching elective (PHED 323, 325 or 326)	2	..
PHED 480—Measurement in Physical Education and Health	..	3
EDUC 300—Human Development and Learning	..	6
Electives	2	..
Total	16	17
Senior Year		
EDUC 301—Foundations of Education	3	..
PHED 333—Adapted Physical Education	2	..
EDSE 330—Principles and Methods of Secondary Education	3	..
EDSE 374—Student Teaching in Secondary Schools	..	8
PHED 460—Theory of Exercise	3	..
PHED 381—Advanced Training and Conditioning	3	..
PHED 490—Organizations and Administration of Physical Education	..	3
PHED 314—Methods, Curriculum and Observation for Secondary Schools	..	3
Electives	3	3
Total	17	17

PHYSICAL EDUCATION CURRICULUM FOR WOMEN

	Semester I	Semester II
Freshman Year		
ENGL 101, 201—Composition and Literature	3	3
Social Science Elective	..	3
ZOOL 101—General Zoology	4	..
SPCH 107—Public Speaking	2	..
MATH 105 or 110 (any above MATH 001)	..	3
PHED 180—Introduction to Physical Education and Health	2	..
PHED 181—Fundamentals of Movement	2	..
PHED 182—Rhythmic Activities	2	..
DANC 100—Dance Techniques	..	2
PHED 186, 190—Skills Laboratory	2	2
HLTH 140—Personal and Community Health	..	3
Electives	..	1
Total	17	17
Sophomore Year		
ENGL 202—World Literature	3	..
ZOOL 201, 202—Human Anatomy and Physiology	4	4

Social Science Elective	3	..
HIST 221 or 222—U.S. History	..	3
Science Group Requirement (Physics 101, 111 or Chemistry 102, 103 or 105)	..	3
HLTH 150—First Aid and Safety	1	..
PHED 262W, 264W—Skills Laboratory	2	2
PHED 274W—Aquatics	..	2
PHED 282W—Organization and Administration of Intramurals	1	..
Electives	4	2
Total	18	16

Junior Year		
Fine Arts Elective	..	3
History	..	3
PHED 400—Kinesiology	4	..
PHED 305W, 307W—Laboratory Skills	2	2
EDUC 300—Human Development and Learning	6	..
PHED 493—History and Philosophy of Sports and Physical Education	3	..
PHED 420—Physical Education for the Elementary Schools	..	3
PHED 324W—Theory of Coaching	..	2
PHED 480—Measurement in Physical Education and Health	..	3
Electives	1	1
Total	16	17

Senior Year		
EDUC 301—Foundations of Education	3	..
EDUC 330—Principles and Methods of Secondary Education	3	3
EDSE 374—Student Teaching in Secondary Schools	..	8
PHED 333—Adapted Physical Education	2	..
PHED 460—Theory of Exercise	3	..
PHED 490—Organization and Administration of Physical Education	..	3
PHED 314—Methods in Physical Education in Secondary Schools	..	3
Electives	6	3
Total	17	20

REQUIREMENTS FOR DEGREE IN PHYSICAL EDUCATION

Requirements for the Bachelor of Science degree in physical education in the College of Physical Education, Recreation and Health are as follows:

Men	Sem. Cr.
Professional Physical Education Courses PHED 180, 182, 185, 187, 261M, 263M, 274M, 400, 305M, 307M, 314, 420, (323 or 325 or 326), 333, 460, 480, 381, 490, 493	48
Foundation Science courses as presented ZOOL 101, 201, 202; PHYS 111 or CHEM 102	16
Education courses as prescribed	20
General Education Requirements ENGL 101, 201, 202; Fine Arts; HIST, MATH 105 or 110; Soc. Sc.; Science, as shown above	27
Specially prescribed requirements (SPCH 107)	2
Health courses as prescribed (HLTH 140, 150)	4
Electives	19
Total	136

Women	Sem. Cr.
Professional Physical Education Courses PHED 180, 181, 182, 186, 190, 262W, 264W, 274W, 282W, 400, 305W, 307W, 314, 420, 324W. 460, 480, 490, 493, DANC 100	49
Foundation Science courses as prescribed ZOOL 101, 201; PHYS 111 or CHEM 102	16
Education courses as prescribed	20
General Education Requirements ENGL 101, 201, 202; Fine Arts 3 hrs.; MATH 105 or 110; Soc. Sc. 6 hours; Science, as shown above	27
Specially prescribed requirements (SPCH 107)	27
Health courses as prescribed (HLTH 140, 150)	4
Electives	18
Total	136

MINOR IN PHYSICAL EDUCATION

20 semester hours in physical education and 4 semester hours in cognate areas.

REQUIRED COURSES

Men and Women—PHED 265M, 274H or 276W, 400, 333, 460, 480, 381, 485, 487, 490, 493.

Women—PHED 180; 186, 190, 262W, 264W (2-6); 314; 324W.

ELECTIVE COURSES

Men and Women—PHED 265M, 274H or 276W, 400, 333, 460, 480, 381, 485, 487, 490, 493.

If planning to teach, the cognate courses for men should be HLTH 140 and HLTH 150; for women, HLTH 150 and HLTH 420.

Note: To be certified to teach in Maryland, 30 semester hours are required in physical education in addition to the following or equivalent, ZOOL 101, 201, 202 and chemistry or physics.

There are two plans for a minor in elementary school physical education. Plan A is for students in the Department of Physical Education, and Plan B is for students outside the Department of Physical Education.

1. Plan A. (for students in this department)
   10 semester hours in elementary school physical education courses and 10 hours in cognate areas.

Required Courses

PHED 183, 184, 420, 495.

Elective Courses

10 hours in any of the following cognate areas: human development, elementary education, biological science, health education. (Not more than 6 hours shall be taken in any one cognate area.)

Student Teaching

Students will be required to do four weeks of their eight weeks student teaching at the elementary school level in physical education.

II. Plan B. (for students outside this department)
   13 semester hours in elementary school physical education courses and 10 hours in cognate areas.

Required Courses

PHED 183, 184, 330, 420, 495.

Elective Courses

10 hours in any of the following cognate areas: human development, elementary education, biological science, health education. (Not more than 6 hours shall be taken in any one cognate area.)

HONORS PROGRAM

THE HONORS PROGRAM IN PHYSICAL EDUCATION

The aim of the Honors Program is to encourage superior students by providing an enriched program of studies which will fulfill their advanced interests and needs. Qualified students are given the opportunity to undertake intensive and often independent studies wherein initiative, responsibility and intellectual discipline are fostered. To qualify for admission to the program:

1. A freshman must have a "B" average in academic (college prep) curriculum of an accredited high school.
2. A sophomore must have an accumulative GPA of 3.00 in all college courses of official registration.
3. All applicants must have three formal recommendations concerning their potential, character, and other related matters.
4. All applicants must be accepted by the Faculty Honors Committee.

In completing the program, all honors students must:

1. Participate in an honors seminar where thesis and other relevant research topics are studied.
2. Pass a comprehensive oral examination covering subject matter background.
3. Successfully prepare and defend the honors thesis.

On the basis of the student's performance in the above program, the college may vote to recommend graduation without honors, with honors, or with high honors.

Course Code Prefix—PHED

PHYSICAL SCIENCES PROGRAM

PURPOSE

This program is suggested for many types of students: those whose interests cover a wide range of the physical sciences; those whose interests have not yet centered on any one science; students interested in a career in an interdiscplinary area within the physical sciences, students who seek a broader undergraduate program than is possible in one of the traditional physical sciences, preprofessional students (prelaw, premedical); or students whose interests in business, technical writing, advertising or sales require a broad technical background. This program can also be useful for those planning science-oriented or technical work in the urban field; some of the Urban Studies courses should be taken as electives. Students contemplating this program as a basis for preparation for secondary school science teaching are advised to consult the Science Teaching Center staff of the College of Education for additional requirements for teacher certification.

The Physical Science Program consists of a basic set of courses in physics, chemistry and mathematics, followed by a variety of courses chosen from these and related disciplines: astronomy, geology, meteorology and computer science. Emphasis is placed on a broad program as contrasted with a specialized one.

Students are advised by members of the Physical Science Committee. This committee is composed of faculty members from each of the represented disciplines and some student representatives. Assignment of advisor depends on the interest of the student, e.g., one interested principally in chemistry will be advised by the chemistry member of the committee. Students whose interests are too general to classify in this manner will normally be advised by the Chairman of the committee.

The Physical Science Committee includes the following faculty and disciplines:

Chairman, Astronomy:	E. Smith
Chemistry:	R. Jaquith
Computer Science:	J. Vandergraft
Mathematics:	D. Schneider
Meteorology:	O. Thompson
Physics:	A. deSilva Zorn
Dean's Office, PreMed:	A. Boyd

THE CURRICULUM

The basic courses include MATH 140, 141 and one other math course for which MATH 141 is a prerequisite (11 or 12 credits); CHEM 103 and 104, or 105 and 106 (8 credits); Physics 162, 262, 263 (11 credits); or 141, 142 (8 credits); or 181, 182, 283, 284 (16 credits) or 221, 222 (10 credits), or Physics 121, 122 followed by Physics 262 (12 credits).

The choice of the physics sequence depends on the student's future aims and his background. PHYS 161, 262, 263 is the standard sequence recommended for most Physical Science majors. This sequence will enable the student to continue with intermediate level and advanced courses. PHYS 141, 142 is available to students who wish a less extensive background in physics than is represented by Physics 161-263 or 181-284. Students desiring a strong background in physics are urged to enroll in PHYS 181, 182, 283, 284. This is the sequence also used by Physics majors and leads directly into the advanced physics courses. PHYS

221, 222 is designed for Education majors, and therefore is suitable for students thinking in terms of a teaching career. PHYS 121, 122 plus 262 is offered as an option only for students who have already taken PHYS 121, 122 and then decide to major in Physical Sciences. This sequence should not be selected by students already in or just starting the program. The rationale for requiring PHYS 262 to follow 121, 122 is to ensure that students have some physics with calculus (121, 122 do not have a calculus corequisite).

Beyond these basic courses the student must complete 24 credits of which 12 must be at the 300 or 400 level, chosen from the following disciplines: Chemistry, physics, mathematics, astronomy, geology, meteorology, and computer science. Students presenting Physics 284 as part of their basic curriculum may include these four credits among these 24 credits. The 24 credits must be so distributed that he has at least six credits in each of any three of the above listed disciplines. The university requirement of an average grade of at least "C" in the courses counting toward the major applies by including both the basic plus the broader set of courses.

Students who wish to depart from the stipulated curriculum may present their proposed program for approval by the Physical Science Committee. An honors program is available to qualified students in their senior year.

Certain courses offered in these fields are not suitable for Physical Science majors and cannot count as part of the requirements of the program. These include ASTRO 100, CMSC 100, PHYS 400, 401, CHEM 101, 102, 107, GEOL 431, 432, 460, 489, or courses correpsonding to a lower level than the basic courses specified above (e.g. MATH 115).

HONORS PROGRAM

The Physical Science honors program offers students the opportunity for research and independent study. Interested students should request details from their advisor.

PHYSICS AND ASTRONOMY

Professor and Chairman: Laster.
Professor and Director of Astronomy: Westerhout.
Assistant Professor and Associate Chairman: Greene.
Professors: Alley, Banerjee, Brill, Day, Erickson, Ferrell, Glasser,[1] Glover, Greenberg, Griem, Holmgren, Hornyak, Kerr, Krall, Kundu, Levinson, MacDonald, Marion, Misner, Myers, Oneda, Prange, Pugh, Reiser,[3] Snow, Sucher, Trivelpiece, Wall, Weber, Westerhout, Yodh, G. Zorn.
Professors, Part-Time: Brandt, Friedman, Hayward, McDonald, Opik, Rado, Slawsky.
Visiting Professors: Escobar, Fowler.
Associate Professors: A'Hearn, Anderson, Bardasis, Beall, Bell, Bhagat, Currie, Davidson, DeSilva, Dorfman,[1] Dragt, Earl, Falk, Fivel, Glick, Griffin, Kacser, H. G. Kim,[4] Y. S. Kim, Matthews, Minkiewicz, Pati, Roos, Rose, Roush,[2] E. Smith, Steinberg, Stephenson, Wentzel, Woo, Zipoy, B. S. Zorn, Zuckerman.
Associate Professors, Part-Time: Bennett, Dixon, Johnson, Pechacek.
Assistant Professors: Barnett, Brayshaw, C. Y. Chang, R. F. Chang, Chant, Connors, Drew, Ellsworth, Gloeckler, Glosser, Goldberg, Gowdy, Harrington, Hill, Korenman, Layman,[5] Martin, O'Gallagher, Redish, Richard, Schwartz, Simonson.
Assistant Professor, Part-Time: Larson.[3]
Visiting Assistant Professors: Nutku, Pereira, S. Smith.

[1] Also Member of the Institute for Fluid Dynamics.
[2] Joint appointment with Chemical Engineering.
[3] Joint appointment with Electrical Engineering.
[4] Joint eppointment with Computer Science.
[5] Joint appointment with College of Education.

The Physics program includes a broad range of undergraduate courses designed to satisfy the needs of almost every student, from the advanced physics major to the person taking a single introductory physics course. In addition, there are various opportunities for personally directed studies between student and professor, and many undergraduate "research" opportunities also are available. For further information consult "Department Requirements for a B.S. degree in Physics," available from the Department.

SERVICE COURSES—GENERAL EDUCATION REQUIREMENT

The department offers several courses which are intended for students other than physics majors. PHYS 111, 112, 111A, or 114 are designed to fulfill the General Education requirements for non-laboratory physical science, and PHYS 117 satisfies the requirement for a physical science with laboratory. PHYS 121, 122 or 141, 142 satisfy the requirements for professional schools such as medical and dental, and PHYS 161, 262, 263 satisfy the introductory physics requirement for most engineering programs. PHYS 318 is a one semester course stressing contemporary topics for those who have completed a year of one of the above sequences. In addition, PHYS 420 is a one semester modern physics course for advanced students in science or engineering. Either the course sequence 161, 262, 263, or the full sequence 181, 182, 283, 284 is suitable for mathematics students and those who major in other physical sciences.

THE PHYSICS MAJOR

The way most physics majors will begin their work is with a two-year basic sequence of physics courses, PHYS 181, 182, 283, 284, accompanied by the laboratory courses PHYS 285, 286 in the second year. Transfer students who come with a

different set of introductory courses either will be put into an appropriate course in this sequence or will take bridging courses, such as PHYS 404, 405, and then go on to advanced courses; usually they will not repeat work previously done by taking the entire basic sequence.

The minimum requirement for a physics major is 38 semester hours of work in physics, including four laboratory courses and PHYS 410, 411, 421 and 422, and 19 semester hours of mathematics courses. After taking the basic sequence, the student will have some flexibility in his program, and he will be able to take specialty courses, such as those in nuclear physics or solid-state physics, which are of particular interest to him. In addition, a student interested in doing research may choose to do a Bachelor's thesis under the direction of a member of the faculty.

HONORS IN PHYSICS

The Honors Program offers to students of good ability and strong interest in physics a greater flexibility in their academic programs, and a stimulating atmosphere through contacts with other good students and with individual faculty members. There are opportunities for part-time research participation which may develop into full-time summer projects. An honors seminar is offered for advanced students; credit may be given for independent work or study, and certain graduate courses are open for credit toward the bachelor's degree.

Students are accepted by the department's Honors Committee on the basis of recommendations from their advisors and other faculty members, usually in the second semester of their junior year. A final written and oral comprehensive examination in the senior year is optional, but those who pass the examination will graduate "with honors in physics."

Course Code Prefix—PHYS

PRE-PROFESSIONAL CURRICULA

There are a number of programs developed to prepare the pre-professional student. These curricula, some rather general and others quite specific, are designed to give the student the best background to succeed in his advanced training, to fill undergraduate requirements of professional schools, and to fit in with the requirements established by the organizations associated with the respective professions.

Pre-professional programs require that the student maintain a grade point average higher than the minimum for graduation. The student may fulfill requirements by majoring in almost any discipline in some programs, provided the specific requirements of the pre-professional program are met. The successful completion of the pre-professional program does not guarantee admission to professional school. Each school has its own admissions requirements and criteria, generally based upon the grade point average in the undergraduate courses, the scores in aptitude tests (Medical College Admission Test, Law Admission Test, Dental Aptitude Test, etc.), a personal interview, and letters sent by the Evaluation Committee of the college. For the specific admissions requirements, the student is urged to study the catalog of the professional school of his choice.

Although completion of the bachelor's degree is a normal prerequisite for admission for dental, law, and medical schools, three professional schools of the University of Maryland in Baltimore —Dentistry, Law, and Medicine—have arrangements whereby a student who meets requirements detailed below may be accepted for professional school after three years (90 academic hours). For the students to be eligible for the "combined degree," the final thirty hours prior to entry into the Schools of Dentistry, Law, and Medicine must be taken in residence. After the successful completion of thirty hours of work in professional school, the student may be eligible for a bachelor's degree.

PRE-DENTAL HYGIENE

The first two years of the pre-professional curriculum are as follows:

Freshman Year

	1st Sem.	2nd Sem.
English Composition 101	3	..
Zoology (General) 100	4	..
Chemistry 103 and 104	4	4
Psychology 100—General	3	..
Sociology 100—Introduction	..	3
*Humanities	..	9
Physical Education	(1)	(1)
Total	14	16

Sophomore Year

	1st Sem.	2nd Sem.
Zoology 201 and 202	..	..
Human Anatomy & Physiology	4	4
Microbiology 200	4	..
Nutrition 200	..	3
**Social Science	3	3
*Humanities	3	3
Electives (lower division)	3	3
Total	17	16

Minimum requirement for Junior status 63

*Humanities courses must be selected from at least three of the following areas: literature, history, philosophy, fine arts, speech, math or language.

**Social Sciences must include General Psychology and Sociology with the remaining six credits selected from courses in: psychology, sociology, government and politics, economics, anthropology, or geography.

Although courses may be interchanged during the first two years, it is required that chemistry precede microbiology and nutrition to en-

able its application to these two subjects. It should be noted that Zoology 101 is a prerequisite for Zoology 201, 202 (Human Anatomy and Physiology) at the University of Maryland.

PRE-DENTISTRY

The pre-dental program is based upon requirements established by the Council of Dental Education of the American Dental Association, and the College Park requirements for a degree following either the regular four-year program or the combined "Arts-Dentistry" program. The program is designed to prepare the student for the Dental Aptitude Test, normally taken in the spring of the junior year.

The minimum requirements for entry into dental school for either the three-year program (94 academic hours) or the four-year program (120 academic hours) are:

General Education requirements		34 hours
College requirements		
Foreign Language	0-12	
Speech	2	14 hours
plus		
Major		variable
Supporting courses (or "minor")		variable
Dental Association requirements		
Chemistry—organic		18 hours
General		
Zoology	8	
Mathematics	4-6	
Physics	8	38-40 hours

Electives—to complete the 94 or 120 hours required.
Required Health and Physical Education.

Four-Year Program. A student applies to dental school in his senior year, on the basis of completing the usual degree requirements for the B.A. or B.S. degree by majoring in the field of his choice and including in his course work the courses specifically prescribed by dental schools.

Three-Year Arts-Dentistry Program. Students whose performance during the first two years in residence at College Park is exceptional may be encouraged to seek admission to the University of Maryland Dental School at the end of their third year (94 academic hours). No undergraduate major is required for this program: the work of the first year of dental school is considered as the major; but students will select a minor (supporting courses) from one of the following combinations: zoology, six hours on the 300-400 level; microbiology, eight hours on the 300-400 level; CHEM 219 or 321 plus three hours on the 300-400 level in any science; CHEM 461, 462, 463, and 464; or nine hours on the 300-400 level in any one department of the arts, humanities, or social sciences.

Students accepted in the combined Arts-Dentistry program may receive the B.S. degree (Arts-Dentistry) after satisfactory completion of the first year at the University of Maryland Dental School upon recommendation by the Dean of the Dental School and approval by the College Park Campus, the degree to be awarded in August following the first year of dental school; 90 hours must be completed before the professional training is commenced.

Schedule. The pre-dental student, regardless of degree sought, includes in his first-year schedule CHEM 103, 104 or 105, 106, ZOOL 101, 102, MATH 110, 111 or (115), 140, ENGL 101, and the required health and physical education. The second year includes CHEM 201-204 or 211-214, the third year PHYS 121, 122. The schedules are completed with general education requirements, college requirements, major department requirements and electives. It is urged that the second year also include ZOOL 290 (a requirement of the University of Maryland Dental School) and 246. A course in statistics (such as PSYC 200 or SOCY 201) is required by the University of Maryland Dental School.

PRE-FORESTRY

The pre-forestry students are advised in the Botany Department. The State of Maryland has an agreement with the Southern Regional Education Board and North Carolina State University providing for five Maryland residents who have completed two years study in pre-forestry and have been accepted in the School of Forestry at North Carolina State University. The State of Maryland will make payment toward the nonresident tuition for a period not to exceed two years (four semesters) in accordance with the funds appropriated in the State budget for this purpose.

The Pre-Forestry Curriculum Includes:

	Semester Credit Hours
ENGL 101,201,202 or equivalent	9
BOTN 100	4
ZOOL 101	4
MATH 110,111,220,221	12
CHEM 103,104	8
PHYS 121,122	8
SPCH 107	2
BOTN 212	3
HORT 171	3
AGRI 101	1
Social Science	6
Economics	3
HLTH 105	(2)

Students planning for three years in the pre-forestry curriculum should include BOTN 221, ENTM 200, AGRO 102, AGEN 100, AGRO 202, and BOTN 211.

PRE-LAW

Although some law schools will consider only applicants with a B.A. or B.S. degree, others will accept applicants who have successfully completed a three-year program of academic work. Most law schools do not prescribe specific courses

which a student must present for admission, but do require that the student follow one of the standard programs offered by the undergraduate college. Many law schools require that the applicant take the Law Admissions Test in the academic year preceding his entry into professional school.

Four-Year Program. The student who plans to complete the requirements for the B.A. or B.S. degree before entering law school should select a major field of concentration. The pre-law student ordinarily follows a Bachelor of Arts program with a major in American studies, English, American and English history, economics, political science (government and politics), psychology, sociology, or speech; a few pre-law students follow a bachelor of science program.

Three-Year Arts-Law Program. The student who plans to enter law school at the end of his third year should follow the general B.A. program during his first two years. During his junior year, he will complete the requirements for a supporting course program (18 semester hours in one department, 6 hours being at the 300-400 level). His program during the first three years should include all of the basic courses required for a degree (including the 18-hour supporting course program) and all College and University requirements. The academic courses must total 90 hours, and must be passed with a minimum average of 2.0.

Students with exceptional records who are accepted to the School of Law of the University of Maryland under the Arts-Law program may receive a B.A. degree (Arts-Law) after satisfactory completion of the first year of law school, upon recommendation by the Dean of the University of Maryland Law School and approval by the College Park Campus. The degree is awarded in August following the first year of law school (or after 30 credit hours are completed).

PRE-MEDICAL TECHNOLOGY

Students must complete 90 semester-hours or more in academic subjects before being admitted to the senior year. (The two semester hours in HLTH 105 and in physical education do not count toward this 90 semester hour total). The following courses are intended as a guide for the student in planning a curriculum which will meet both the University of Maryland requirements for graduation and the special requirements for the Registry Examination administered by the ASCP board of Schools.

MEDICAL TECHNOLOGY REQUIREMENTS
(Pre-clinical Years)

CHEMISTRY (16-credit minimum)

	Credits
CHEM 103, 104—College Chemistry I, II	4, 4
CHEM 201, 202—College Chemistry III and Laboratory	3, 2
CHEM 203, 204—College Chemistry IV and Laboratory	3, 2

BIOLOGICAL SCIENCE (16-credit minimum)

ZOOL 101—General Zoology	4
ZOOL 201, 202—Human Anatomy and Physiology	4, 4
MICB 200—General Microbiology	4

MATHEMATICS (6-credit minimum)

MICB 440—Pathogenic Microbiology	4
MATH 110, 111—Introduction to Math	3, 3
OR	
MATH 115, 140—Introductory Analysis and Analysis I	3, 4

GENERAL EDUCATION COURSES (See University Requirements)

RECOMMENDED ELECTIVES

SPCH 100 or 107—Public Speaking
PSYC 100—Psychology
PHYS 121, 122 or 117—General Physics
ZOOL 246—Genetics
ZOOL 495—Animal Histology
ZOOL 475—General Parasitology
ZOOL 441—Cell Biology
CHEM 461, 462, 463, 464—Biochemistry
MICB 450—Immunology
MICB 460—General Virology

RECOMMENDED COURSE SEQUENCE FOR FIRST THREE YEARS

Freshman Year

First Semester		Second Semester	
Chemistry 103	4	Chemistry 104	4
Zoology 101	4	Math 111	3
Math 110 (or Math 115)	3	(or Math 140 . . . 4)	
English 101	3	Speech 100 (or 107)	3
PHED	(1)	Health 105	(2)
	15	English 201	3
		PHED	(1)
			16

Sophomore Year

First Semester		Second Semester	
Chemistry 201	3	Chemistry 203	3
Chemistry 202	2	Chemistry 204	2
English 202	3	Microbiology 200	4
History	3	History	3
Psyc 100	3	†Physics 122 (or elective)	4
†Physics 117 (or 121)	4		16
	18		

Junior Year

First Semester		Second Semester	
†Chemistry 461	3	†Chemistry 462	3
†Chemistry 463	2	†Chemistry 464	2
Microbiology 440	4	Zoology 202	4
Zoology 201	4	Socy 100 (or other Soc. Science)	3
Phil 100 (or course in Fine Arts)	3	Elective	3
	16		15

† Not required but highly recommended.

PRE-MEDICINE

The pre-medical program is based upon the requirements established by the Association of American Medical Colleges and the requirements for a degree from the College Park Campus, either with the four-year degree program or with the combined Arts-Medicine program. The curriculum

is designed to prepare the student for the Medical College Admission Test, which is normally taken in the spring of the junior year.

The minimum requirements for entry into medical school for either the three-year program (90 academic hours) or the four-year program (120 academic hours) are:

General Education requirements		34 hours
College requirements		
Foreign Language	0-12	
Speech	2	14 hours
plus		
Major		variable
Supporting courses (or "minor")		variable
Medical School requirements		
Chemistry—general, inorganic		18 hours
organic		
quantitative**		
Zoology	16	
(In addition to ZOOL 101 and 102, two of genetics, embryology, comparative anatomy)		
Mathematics	4-6	
Physics	8	50-52 hours

Electives—to complete the 90 or 120 hours required.
Required Health and Physical Education.

** Recommended but not required by the University of Maryland Medical School; required by some other medical schools.

Four-Year Program. No specific major is required for favorable consideration by a medical school admissions committee. By intelligent planning starting in the sophomore year, the student can meet the above requirements as well as requirements of most majors. The student is urged to work closely with his pre-medical advisor for this planning. A student who enters the pre-medical program late in his college career may find an additional year of study necessary (either as a special student or as a regular undergraduate).

Three-Year Arts-Medicine Program. After completion of his first year of pre-medical study, an exceptional student may be encouraged to seek admission to the University of Maryland School of Medicine at the end of his third year (90 hours). During his next two years he will need to complete all requirements listed above, with the exception of the major and the regular supporting course program. Four additional hours on the 300-400 level in appropriate science courses will satisfy the supporting course requirement.

Students accepted in the combined Arts-Medicine program may receive the B.S. degree (Arts-Medicine) after satisfactory completion of the first year at the University of Maryland School of Medicine (30 hours), upon recommendation by the Dean of the School of Medicine and approval by the College Park Campus. The degree is awarded in August following the first year of medical school.

Schedule. The pre-medical student normally includes in his first year schedule CHEM 103, 104 or 105, 106, ZOOL 101, 102, MATH 110, 111 or (115), 140, ENGL 101 and the required health and physical education. The second year should include CHEM 201-204 or 211-214 and ZOOL 290, 246, the third year PHYS 121, 122. CHEM 219 or 321 would also be taken in the third year in the case of a three-year applicant. The schedules are completed with general education requirements, college requirements, major department requirements and electives.

PRE-NURSING

It is required that all students, including registered nurses, enrolled in or transferring to the program in nursing use the following guidelines for the freshman and sophomore years:

	Semester Hours
English Composition	3
Chemistry (including content in organic chemistry)	6-8
Human Anatomy and Physiology	6-8
Microbiology	3-4
*Social Sciences	12
**Humanities	15
Nutrition (recommended)	3
Electives	7-12
Minimum requirements for Junior status	59-60

Social Sciences include Sociology, Psychology, Political Science, Economics, Geography, Anthropology

Humanities include Literature, History, Philosophy, Foreign Languages, Mathematics, Fine Arts

* Courses must include at least one in sociology and one in psychology.
** Courses must be selected from at least three departments.

The specific courses taken by basic students on the College Park campus are:

	Semester Hours
Chemistry 103, 104	4, 4
English 101	3
Zoology 101	4
*Humanities (Literature, history, philosophy, fine arts, math, language)	15
Psychology 100	3
Sociology 100	3
Other social sciences (sociology, psychology, government and politics, economics, geography)	6
Zoology 201, 202	4, 4
Microbiology 200	4
Nutrition 200	3
Elective	3
	60

* Courses must be selected from at least three of the areas listed.

PRE-PHARMACY

The preprofessional curriculum is designed to provide the student with those courses that satisfy the needs for a more liberal education as well as the scientific prerequisite courses for entrance into the professional program.

First Year	Credits
Chemistry 103, 104	8
Mathematics 115, 140 (Introductory and Elementary Analysis)	6-7
Zoology 101 (or Biology)	4
English 101 (Composition)	3
Elective (Social Sciences)	3
Elective (non-specific)	3
	28

Second Year	
Chemistry 201, 202, 203, 204	*10
Physics 121, 122 (Fundamentals)	8
Elective (Humanities)	6
English 201 (Literature)	3
Elective (non-specific)	3
Elective (Social Science)	3
	33

* Minimum requirement for organic chemistry is 8 credits.

PRE-PHYSICAL THERAPY

The minimum requirements for entry into the junior year of the professional program total 65 hours plus required Health and Physical Education.

Junior Status Minimum Required Hours		*General Education Required Hours*	*Additional Department Required Hours*	
9	English	9		
3	Fine Arts or Philosophy	3		
6	History	6		
6	Mathematics—Introductory level or above	3	3	
24	Science	7	23	
	Chemistry—College			(8)
	Physics			(8)
	Zoology—101, 102			(8)
12	Social Science	6	6	
	Sociology—Intro. to			(3)
	Psychology—Intro. to			(3)
	Two courses above the Introductory level			(6)
3	Speech—Public Speaking		3	
2	Physical Therapy Orientation		2	
65		34	31	

Recommended course sequence for the first two years on College Park Campus.

FRESHMAN YEAR

First Semester		*Second Semester*	
Chemistry 103	4	Chemistry 104	4
English 101, 102	3	Mathematics 111	3
Mathematics 110	3	*Philosophy or Fine Arts	3
Sociology 100	3	Psychology 100	3
Physical Therapy Orientation (BTPT 110)	1	Speech 100	3
Health 105	2	Physical Therapy Orientation (BTPT 111)	1
Physical Education	1	Physical Education	1
	17		18

SOPHOMORE YEAR

First Semester		*Second Semester*	
*English	3	*English	3
*History	3	*History	3
Physics 121	4	Physics 122	4
Psychology	3	Psychology	3
Zoology 101	4	Zoology 102	4
	17		17

*Students may choose any Fine Arts or Philosophy, English or History course that fills the General Education Requirements.
For further information see Physical Therapy listing under the heading of Divisions and Colleges in this catalog.

PHYSICAL THERAPY

Instructor: Joan Novell.

BTPT 110, 111—PHYSICAL THERAPY ORIENTATION. (1,1) One lecture per week. The courses includes a general explanation of the profession. Guest lecturers, films and field trips to local physical therapy clinics are included.

PRE-THEOLOGY

The College of Agriculture cooperates with the officers of any theological seminary who desire to urge prospective students to pursue courses in agriculture as a preparation for the rural ministry. Such pre-theological students may enroll for a semester or more or for the usual four-year training of the College. In either case they should enroll as members of the general curriculum in the College of Agriculture. Students desiring to pursue a pre-theological program in the College of Agriculture of the University of Maryland should consult with the president or admissions officer of the theological seminary which they expect to attend.

PRE-VETERINARY MEDICINE PROGRAM

This program prepares students who wish to appy for admission to colleges of veterinary medicine.

A student who has completed 90 academic semester credits at the University of Maryland and who has successfully completed 30 additional academic semester credits at any accredited veterinary college is eligible to make application for the Bachelor of Science degree from the University of Maryland. Students wishing to apply for the Bachelor of Science degree under this arrangement must have completed all University and college requirements and must also have completed additional credits in animal science.

The State of Maryland has an agreement with the Southern Regional Education Board for the education of students in Veterinary Medicine. Under this agreement up to 12 spaces per year are reserved in the College of Veterinary Medicine at the University of Georgia, and up to a total of six places in the four years at Tuskegee Institute, for qualified Maryland residents who may be offered admission by the respective institution.

The University of Maryland has an agreement with the Ohio State University to enroll up to six

Maryland residents a year who qualify and are selected by the College of Veterinary Medicine Admissions Committee at Ohio State.

The Colleges of Veterinary Medicine at the University of Georgia, the Ohio State University and Tuskegee Institute have the final and exclusive authority on all matters related to admission.

All requirements for admission must be completed prior to matriculation in the College of Veterinary Medicine. After applications have been received, academic records will be summarized and the qualifying applications will be forwarded to the College of Veterinary Medicine, University of Georgia. The College of Veterinary Medicine at the University of of Georgia will invite selected Maryland applicants to the University of Georgia for interviews.

Similar information on applicants will be made available to the College of Veterinary Medicine, the Ohio State University and the College of Veterinary Medicine, Tuskegee Institute.

a. Complete the curriculum shown below with grades not less than C in any subject and a minimum grade point average of 2.5;
b. Take the veterinary medical aptitude test; and
c. Be a resident of Maryland. (See definition of Residence and Non-Residence).

All requirements for admission must be completed prior to matriculation in the College of Veterinary Medicine. After applications have been received, academic records will be summarized and an evaluation of the applicant will be completed. The complete file will be forwarded to the College of Veterinary Medicine, University of Georgia. The College of Veterinary Medicine will invite selected applicants to the University of Georgia for interviews. Similar information on applicants will be made available to the College of Veterinary Medicine, Ohio State University and the College of Veterinary Medicine, Tuskegee Institute.

The Colleges of Veterinary Medicine, University of Georgia, Ohio State University and Tuskegee Institute have the final authority on all matters related to admission. Applicants will be advised by the respective colleges after final evaluations have been made.

Minimum requirements for admission to the Colleges of Veterinary Medicine, University of Georgia and Ohio State University are:

English	6
Biology	8
Physics	8
Chemistry	13
Humanities and Social Sciences	15
Mathematics	6
Electives (zoology, physics, chemistry, genetics or animal science)	6

Pre-veterinary curriculum Combined Degree Requirements:

Biological Sciences	12
Botany (4)	
Zoology (8)	
English and Speech	12
Physical Sciences	30
Chemistry (13)	
Mathematics (6)	
Physics (8)	
Animal Science	15
Genetics	3
Nutrition	3
Social Science	6
History	6
Electives	6
Physical Education	(2)
Health	(2)

Course Code Prefix—ANSC

OTHER PRE-PROFESSIONAL AREAS

Academic preparation for several other professions such as optometry and osteopathy is available. For the requirements of these professional schools, please consult their respective catalogs.

PSYCHOLOGY

Professor and Chairman: Bartlett.

Professors: Anderson, Crites, Goldstein, Gollub, Hodos, Horton, Levinson, Magoon,** Martin, McIntire, D. Mills,** J. Mills, Miner,** Pumroy,** Steinman, Taylor, Tyler, Waldrop.

Associate Professors: Brown, Dies, Fretz, Larkin, Locke,* McKenzie,** Pavey,** Schneider, Scholnick, Sigall, Smith, Steinman, Sternheim, Teitelbaum, Ward.

Assistant Professors: Barrett, Blechman, Carroll, Claiborn, Coursey, Dachler, Evans, Freeman,** Gelso,** Holmgren, Johnson, Meltzer, Osterhouse, Specter, Sternheim, Tanney.**

Instructor: Horton.

Psychology can be classified as a biological science (Bachelor of Science degree) and a social science (Bachelor of Arts degree) and offers academic programs related to both of these fields. The undergraduate curriculum in psychology provides an organized study of the behavior of man and other organisms in terms of the biological conditions and social factors which influence such behavior. In addition, the undergraduate program is arranged to provide opportunities for learning that will equip qualified students to pursue further study of psychology and related fields in graduate and professional schools.

Students who are interested in the biological aspects of behavior tend to choose a program leading to the Bachelor of Science degree, while those interested primarily in the social factors of behavior tend to choose the Bachelor of Arts degree. The choice of program is made in consultation with, and requires the approval of, an academic advisor.

Departmental requirements are the same for the Bachelor of Science and the Bachelor of Arts degrees. A minimum of 25 hours of psychology

* Joint appointment with Business and Public Administration.
** Affiliate appointments

course-work is required; courses taken must include PSYC 100, 200, one of 400, 410, or 420, and an additional 12 hours of 400-level courses (not including 478 and 479). In addition to the above courses in psychology, all majors are required to take: (1) MATH 111 or 140; (2) one course, to be approved by an academic advisor in psychology, above the introductory level in one of the following fields; chemistry, computer science, mathematics, microbiology, physics, or zoology. These two courses may be used as part of the General Education or college requirements in mathematics, and science or for the supporting course requirements described below, but not for both. Majors in psychology are urged to take their mathematics and science courses in their first two years.

The supporting courses to supplement the work in the major for the Bachelor of Science degree must include 18 hours in mathematics and science, beyond those courses required by the college. A minimum of two courses must be laboratory courses, and at least three courses (or 9 hours) must be chosen at the advanced level (beyond the introductory sequence). The particular laboratory and advanced courses must be approved by an academic advisor in the Department of Psychology.

The supporting courses for the Bachelor of Arts degree must include 18 hours which are chosen in related fields to supplement work in the major. Of these 18 hours, six must be chosen at the 300 and 400 level. This set of courses must be approved by an academic advisor in psychology.

All courses taken in PSYC *must* be counted toward the major; a grade of "C" or better must be earned in PSYC 100, 200 and all 400 level courses or the course must be repeated until a "C" or better is earned. The departmental grade point average will be a cumulative computation of *all grades* earned in PSYC and must be 2.0 or above.

Students desiring to enter graduate study in certain areas of psychology are advised to take an additional laboratory course and or participate in individual research projects. Such students should consult an advisor for information about prerequisites for graduate study in psychology.

It should be noted that there are three course content areas that have two courses, one in the 300 sequence and one in the 400 sequence. These include abnormal (331 and 431) personality (335 and 435), child psychology (333 and 433), and industrial psychology (361 and 461). The courses in the 300 sequence provide general surveys of the field and are intended for non-majors who do not plan further in-depth study. The courses in the 400 sequence provide more comprehensive study with particular emphasis on research and methodology. The 400 series are intended primarily for psychology majors. It should be further noted that a student may *not* receive credit for both:

PSYC 331 and PSYC 431
PSYC 333 and PSYC 433
PSYC 335 and PSYC 435
or
PSYC 361 and PSYC 461

HONORS

The Department of Psychology also offers a special program for the superior student which emphasizes independent study and research. Students may be eligible to enter the Honors Program who have a 3.3 grade average in all courses or the equivalent, who are in their junior year, and who demonstrate interest and maturity indicative of success in the program. Students in their sophomore year should consult their advisor or the Departmental Honors Committee for further information.

Course Code Prefix—PSYC

RECREATION

Professor and Chairman: Harvey.
Associate Professors: Churchill, Strobell.
Assistant Professor: Leedy.
Instructors: Fain, Laudenslayer.
Visiting Instructors: Bushart, Hutchison, Stevenson, Hawkins, Jarrell, Sperling.

The increased amount of leisure time existent in our society because of the rapid development of modern civilization, and the imperative need for guidance in the wise use of that leisure time, has made society cognizant of the need for trained recreation leaders.

This curriculum, therefore, is designed to meet the needs of students who wish to qualify for positions in the field of recreation, and the needs of those students who desire a background which will enable them to render distinct contributions to community life. The College draws upon various other departments and colleges within the University for courses to balance and enrich its offerings for its recreation curriculum.

Those majoring in recreation have opportunity for observation and practical experience in local, county, state, and federal public recreation programs, in social and group work agency programs, and in the various programs of the Armed Forces, American Red Cross, local hospitals, etc. Major students are encouraged to select an 'option' area of interest around which to center their elective courses (for instance: public recreation, recreation for the ill and handicapped, outdoor recreation education, resource management program).

A very active student University of Maryland Recreation and Parks Society, an affiliate of the comparable state and national organizations, exercises degrees of leadership in selecting the annual "outstanding senior" and "outstanding alum-

nus" awards, in the granting of the various city, county and state society recreation scholarships, in the programming of the annual 'Governor's Conference on Recreation,' etc. It also provides opportunities for university and community service, for rich practical experience, and for social fellowship for those students having a mutual professional recreation interest.

REQUIREMENTS FOR DEGREE IN RECREATION

Requirements for the Bachelor of Science degree in recreation are as follows:

College recreation courses (RECR 130, 150 or 450, 220, 221, 420, 349, 460, 495, 490)	25-26
Prescribed courses in related areas (PHED 150; 161-164, 261-265 or 305-307; 314 (218); APDS 101; CRFT 102 or EDIN 106; MUSC 155; SOCY 100, 330; SPCH 100, 220; DART 311 or 440; PSYC 100; EDHD 306) or substitutes, if necessary	39
Additional prescribed courses in one recreation option area (public recreation, recreation for the ill and handicapped, outdoor recreation education, resource management, program	12
Prescribed health courses (HLTH 140, 150)	4
Additional General Education requirements (ENGL 9 cr.; HIST 6 cr.; Fine Arts 3 cr.; Science 7 or 8 cr.; MATH 3 cr.)	28-29
Electives (to encourage proficiency in one skill area or provide for a minor)	22
Total	130

MINOR IN RECREATION (24 hrs)

18 semester hours in recreation and 6 semester hours in cognate areas, including in the 18 hours the following:

10 hours in RECR 130, 150, 221, 420, 450, 325, 460, 495 or 490; RECR 220; SOCY 330 or substitute

6 hours of work in areas of the recreational skills—nature, arts and crafts, speech and dramatics—but *not* in the area of the student's major.

2 hours of work in the areas of swimming, sports and dance skills.

or

Other courses approved by the advisor and the various departments involved, depending upon the student's interest and background.

plus

E'ective courses (6 hours) selected with the approval of the advisor.

Course Code Prefix—RECR

RUSSIAN AREA PROGRAM

Director: Yaney

This program is for the student who wants to concentrate his studies in the humanities and the social sciences on the Russian area. It includes work in language and literature, history, government and politics, economics, and geography. The student may emphasize any one of these disciplines in completing his courses. The program prepares the student for graduate work in the Russian area, but by proper selection of courses a student may concentrate his work sufficiently in one discipline to be able to take up graduate work in this particular field.

The student following this program must meet the general requirements for a degree. He should select Russian to meet the foreign language requirement.

The student must complete at least 30 hours of work in the Russian area; including 12 hours of advanced courses in Russian language, 6 hours in Russian history, 6 hours in Russian government, 3 hours in Soviet economics, and 3 hours in Soviet geography.

The student must complete an additional 18 hours of advanced work in the above disciplines. Of these 18, at least 12 must all be in one of the departments and at the 300-400 level.

Normally, the student's advisor will be a Russian specialist in the department in which he does most of his work.

SECONDARY EDUCATION

Art Education: John Lembach, Edward L. Longley, Jr., Harold McWhinnie.

Business Education: C. R. Anderson, Florence Hall, Robert Peters, Jane O'Neill.

Dance Education: Dorothy Madden.

English Education: John Carr, Katherine Grimes, Leonard Woolf.

Foreign Language Education: William DeLorenzo, James MacArthur, Augustine F. Quilici, Guenter Pfister.

Home Economics Education: Christina Brown, Kinsey Green, Louise Lemmon, Julia Miller.

Mathematics Education: Mildred Cole, Neil Davidson, James Fey, James Henkelman.

Music Education: Beula B. Blum, Mary deVermond, Stavroula Fanos, Charles Gallagher, Rose Marie Grentzer, Marion Mueller, Shirley J. Shelley, Corwin Taylor, Gustav Wachhaus, Bruce Wilson.

Physical Education (Men): Jerry Wrenn.

Physical Education (Women): Alice M. Love.

Reading Education: Bruce W. Brigham, Beth Davey.

Science Education: Marjorie Gardner, Melton Golmon, John Layman, J. David Lockard.

Social Studies Education: Arthur Adkins, E. G. Campbell, Joseph Cirrincione, Richard Farrell, Jean Grambs.

Speech Education: Blanton Croft, Ann Schickert, Julie Carter.

The Department of Secondary Education is concerned with the preparation of teachers of junior and senior high schools in the following areas: general business, dance, distributive education, mathematics, reading science, secretarial education, social studies, and speech. In the areas of art and music, teachers are prepared to teach in the elementary, junior and senior high schools. Majors in physical education and agriculture are offered in the College of Physical Education, Recreation and Health and the College of Agriculture in cooperation with the College of Education. In

reading education, an elective (mandatory for English education students) is offered at the undergraduate level. Majors in reading are offered only at the graduate level, requiring a bachelor's degree, certification, and at least two years of successful teaching experience as prerequisites.

Students enrolled in the secondary teacher preparation curriculum will meet the University general education requirements, plus the following:

All students who pursue the Bachelor of Arts degree in secondary education are required to complete two years (12 semester hours) of the same foreign language on the college level, or the equivalent. If a student has had three years of one foreign language or two years of each of two foreign languages as recorded on his high school transcript, he is not required to take any foreign languages in the college, although he may elect to do so.

If a student has had one year or less of a foreign language in high school, he must complete through Language 115 of a modern foreign language or Language 204 of a classical language.

If a student has had two years of a foreign language in high school, he must complete through the intermediate level of the foreign language of his choice. In the modern languages, French, German and Spanish, he should take the placement test in the language in which he has had work if he wishes to continue the same language; his language instruction would start at the level indicated by the test. With the classical languages, he should start at the level indicated in the catalog.

For students that come under the two immediately preceding paragraphs, the placement test serves also as a proficiency test and may be taken by a student any time (once a semester) to try to fulfill the language requirement.

Students who have studied languages other than French, German or Spanish or who have lived for two or more years in a foreign country where a language other than English prevails, shall be placed by the chairman of the respective language section, if feasible, or by the heads of the foreign language departments. Native speakers of a foreign language shall satisfy the foreign language requirement by taking 12 hours of English.

All students who elect the secondary education curriculum will fulfill the preceding *general* requirements and also prepare to teach one or more school subjects which will involve meeting *specific* requirements in *particular* subject matter fields.

The Bachelor of Arts degree is offered in the teaching fields of art, English, dance, foreign languages, mathematics, social studies, and speech. The Bachelor of Science degree is offered in art, business education, home economics, mathematics, music, science, and speech.

The student teaching semester is considered a full-time commitment. Consequently, interference with this commitment due to employment is not permitted.

Living arrangements, including transportation, for the student teaching assignments are considered the responsibility of the student.

ART EDUCATION

Students in art education enroll in one of two programs, elementary or secondary art education. The proposed programs are listed below:

SECONDARY ART EDUCATION CURRICULUM

	Semester I	Semester II
Freshman Year		
ENGL 101—Composition or alternate	3	..
ENGL 201—World Literature or Alternate	..	3
Social Science requirement	3	3
ARTH 100—Introduction to Art	3	..
ARTS 100—Design I	3	..
ARTS 110—Drawing I	..	3
HLTH 105—Science and Theory of Health	..	(2)
Physical Education	(1)	(1)
Foreign Language	3	3
Total	16	15
Sophomore Year		
ENGL 202—World Literature or Alternate	3	..
SPCH 100—Public Speaking	3	..
Foreign Language or electives	3	3
Mathematics	..	3
ARTH 260, 261—Art History	3	3
ARTS 220—Painting I	..	3
DART 170—Stagecraft	3	..
CRAF 220—Ceramics	..	3
Electives in Art*	3	3
Total	18	18
Junior Year		
EDUC 300—Human Development and Learning	6	..
History requirements	3	3
Science	3	4
APDS 330—Typography and Lettering	..	3
ARTS 210—Drawing II	..	3
ARTS 340—Printmaking I	3	..
ARTS 330—Sculpture I	..	3
Total	15	16
Senior Year		
EDUC 301—Foundations of Education	3	..
Electives	6	..
Electives in Art*	6	..
EDSE 340—Curriculum, Instruction, Observation—Art	..	3
EDUC 440—Audio-Visual Education or Education Elective	..	3
EDSE 330—Principles and Methods of Secondary Education	..	3
EDSE 360—Student Teaching in the Secondary School	..	8
Total	15	17

* Art Electives must be chosen with the approval of the advisor and of the 12 credit hours required in the secondary program at least three must be in crafts.

ELEMENTARY ART EDUCATION CURRICULUM

	Semester I	Semester II
Freshman Year		
ENGL 101—Composition or Alternate	3	3
Social Science requirement	3	3
ARTH 100—Introduction to Art	3	..

ARTS 100—Design I or ARTE 100—Fundamentals of Art	3	..
ARTS 110—Drawing I	..	3
HLTH 105—Science and Theory of Health	..	(2)
Physical Education	(1)	(1)
Foreign Language or electives	3	3
Total	16	15
Sophomore Year		
ENGL 202—World Literature or alternate	3	..
Science requirement	3	4
Mathematics	3	..
ARTH 260, 261—Art History	3	3
ARTS 220—Painting I	..	3
SPCH 100—Public Speaking	3	..
CRAF 220—Ceramics	..	3
Foreign Languages or electives	3	3
Total	18	18
Junior Year		
EDUC 300—Human Development and Learning	6	..
History requirements	3	3
Foreign Language or electives	3	3
ARTS 330—Sculpture I	..	3
DART 170—Stagecraft	3	..
Electives in Art	..	6
Total	15	15
Senior Year		
CRAF 202—Creative Crafts	3	..
EDUC 301—Foundations of Education	3	..
EDEL 412—Art in the Elementary School	2	..
Electives in Art**	6	..
Electives	3	..
EDEL 340—Curriculum, Instruction, Observation Art	..	3
EDUC 440—Audio-Visual Ed. or Ed. Elective	..	3
EDEL 311—The Child and the Curriculum	..	3
EDEL 332—Student Teaching in the Elementary School	..	8
Total	17	17

** Art Electives must be chosen with the approval of the advisor, and of the 12 credit hours required in the elementary program at least three must be in crafts.

BUSINESS EDUCATION

Three curricula are offered for the preparation of teachers of business subjects. The General Business Education curriculum qualifies for teaching all business subjects except shorthand. Providing thorough training in general business, including economics, this curriculum leads to teaching positions on both junior and senior high school levels.

The Secretarial Education curriculum is adapted to the needs of those who wish to become teachers of shorthand as well as other business subjects.

The Distributive Education curriculum prepares students for vocational teaching requirements in cooperative marketing and merchandising programs.

GENERAL BUSINESS EDUCATION

Freshman Year		
ENGL 101, 201—Composition, and World Literature or alternates	3	3
Fine Arts and Philosophy requirement	3	..
SPCH 100—Public Speaking	..	3
BSAD 110—Elements of Business Enterprise	3	..
GEOG 203—Introduction to Economic Geography	..	3
MATH 110, 111—Introduction to Mathematics	3	3
ECON 100—Economic Developments	3	..
EDSE 100, 101—Principles of Typewriting and Intermediate Typewriting	2	2
Physical Education	(1)	(1)
HLTH 105—Science and Theory of Health	..	(2)
Total	18	17
Sophomore Year		
English Literature	3	..
History requirements	3	3
ECON 201, 203—Principles of Economics	3	3
EDSE 200—Office Typewriting Problems	2	..
Social Science requirement	..	3
EDSE 201—Survey of Office Machines	..	2
BSAD 220, 221—Principles of Accounting	3	3
Science requirements	4 or 3	3 or 4
Total	17 or 18	17 or 18
Junior Year		
EDUC 300—Human Development and Learning	6	..
IFSM 401—Electronic Data Processing	..	3
BSAD 350—Marketing Principles and Organization	3	..
BSAD 380—Business Law	..	3
Elect 300 or 400 level course in Economics	..	3
Electives*	6	6
Total	15	15

* A minimum of 55 semester hours of courses in economics, business administration and business education courses are required.

Senior Year		
EDUC 301—Foundations of Education	3	..
IFSM 402—Electronic Data Processing Applications	3	..
EDSE 341—Curriculum, Instruction, and Observation—Business Subjects	3	..
EDSE 330—Principles and Methods of Secondary Education	3	
EDSE 300—Techniques of Teaching Office Skills	..	3
EDSE 361—Student Teaching in the Secondary Schools	..	8
EDSE 415—Financial and Economic Education	3	..
EDSE 416—Financial and Economic Education	..	3
Total	15	14

SECRETARIAL EDUCATION

Freshman Year		
ENGL 101, 201—Composition and World Literature or alternates	3	3
Fine Arts or Philosophy requirement	3	..
MATH 110—Introduction to Mathematics	3	..
SPCH 100—Public Speaking	..	3
EDSE 100—Principles of Typewriting (If exempt, BSAD 110)	2	..
EDSE 101—Intermediate Typewriting	..	2
EDSE 102, 103—Principles of Shorthand I, II	3	3
Social Science requirement	..	3
Physical Education	(1)	(1)
HLTH 105—Science and Theory of Health	..	(2)
Total	15	17

Sophomore Year		
ENGL 202—World Literature or alternate	..	3
History requirement	3	3
Science requirement	3 or 4	4 or 3
ECON 201, 203—Principles of Economics	3	3
EDSE 200—Office Typewriting Problems	2	..
EDSE 201—Survey of Office Machines	..	2
EDSE 204—Advanced Shorthand and Transcription	3	..
EDSE 205—Problems in Transcription	..	3
Total	14 or 15	17 or 18
Junior Year		
EDUC 300—Human Development and Learning	6	..
BSAD 220, 221—Principles of Accounting	3	3
EDSE 304—Administrative Secretarial Procedures	..	3
BSAD 380—Business Law	..	3
Electives*	6	6
Total	15	15
Senior Year		
EDUC 301—Foundations of Education	3	..
EDSE 305—Secretarial Office Practice	3	..
IFSM 401—Electronic Data Processing	3	..
EDSE 300—Techniques of Teaching Office Skills	..	3
EDSE 341—Curriculum, Instruction and Observation—Business Subjects	3	..
EDSE 330—Principles and Methods of Secondary Education	3	..
EDSE 361—Student Teaching in Secondary Schools	..	8
Electives—300 or 400 Level	3	3
Total	18	14

DISTRIBUTIVE EDUCATION

Freshman Year		
ENGL 101, 201—Composition and American Literature or alternate	3	3
ARTH 100—Fine Arts	3	..
MATH 105—Fundamentals of Mathematics	3	..
Science requirement	3	4
BSAD 110—Elements of Business Enterprise	3	..
SPCH 100—Public Speaking	..	3
Social Science requirement	..	3
Health 105	..	(2)
PE	(1)	(1)
	16	16
Sophomore Year		
History requirement	3	3
ECON 201, 203—Principles of Economics	3	3
BSAD 220, 221—Principles of Accounting	3	3
ENGL 202—World Literature or alternate	3	..
Electives*	3	6
Total	15	15
Junior Year		
BSAD 350—Marketing Principles and Organization	3	..
BSAD 351—Marketing Management	..	3
BSAD 360—Personnel Management I	3	..
BSAD 460—Personnel Management II	..	3
EDUC 300—Human Development and Learning	6	..
EDSE 423—Field Experiences: Distribution	..	3
EDSE 415—Financial & Economic Education	..	3
Electives*	6	3
Total	18	15
Senior Year		
EDUC 301—Foundations of Education	3	..
BSAD 380—Business Law	3	..
*Electives	6	..
EDSE 343—Curriculum, Instruction, and Observation: Distributive Education	..	3
EDSE 330—Principles of Secondary Education	..	3
EDSE 363—Student Teaching	..	8
EDSE 420—Organization & Coordination of DE.	3	..
Total	15	14

* A minimum of 55 semester hours of courses in economics, business administration and business education are required.

DANCE EDUCATION

The Dance Education curriculum prepares students for teaching in the public schools, for further graduate study, and for possible teaching in college.

	Semester I	Semester II
Freshman Year		
ENGL 101—Composition or alternate	3	..
ENGL 201—World Literature or alternate	..	3
ZOOL 101—General Zoology	4	..
Social Science Elective	3	..
DANC 102—Rhythmic Invention for Dance	..	2
DANC 100, 104—Dance Techniques	2	2
DANC 200—Introduction to Dance	..	3
MATH 110—Introduction to Mathematics	..	3
HLTH 105—Science and Theory of Health	(2)	..
History	3	..
DART 120 Acting	..	3
Physical Education	(1)	(1)
	18	17
Sophomore Year		
ENGL 202—World Literature or alternate	3	..
MUSC 150—Theory of Music or MUSC 155—Fundamentals for the Classroom Teacher	3	..
ART (Studio or History)	3	..
ZOOL 201—Human Anatomy and Physiology	4	..
DANC 248—Dance Techniques	2	..
DANC 348—Dance Techniques	..	2
DANC 208—Elementary Dance Composition	..	3
Social Science Elective	..	3
MUSC 130—Survey of Music Literature	..	3
ZOOL 202—Human Anatomy and Physiology	..	4
Elective	..	3
PHED 150—Rhythmic Activities	2	..
	17	18
Junior Year		
History	3	..
DANC 470—Creative Dance for Children	3	..
DANC 400—Advanced Choreographic Forms	3	..
Electives	6	..
PHED 400—Kinesiology	..	4
EDUC 300—Human Developmental Learning	..	6
DANC 389—Dance Techniques	2	..
DANC 499—Adv. Dance Techniques	..	2
DANC 305—Development of Dance Progression	..	3
Elective	..	3
	17	18

Senior Year		
EDUC 301—Foundations of Education	3	..
DANC—484—Theory and Philosophy of Dance	3	..
DANC 492—Percussion and Music Sources for Dance	3	..
Electives	6	..
EDSE 342—Curriculum, Instruction and Observation	..	3
EDSE 330—Principles and Methods of Secondary Education	..	3
EDSE 362—Student Teaching in Secondary Schools	..	8
	15	14

ENGLISH EDUCATION

A major in English requires 45 semester hours as follows: ENGL 101; 201; 211 or 212; 481; 403 or 404 or 405; or 221 or 222; 482; 493; three hours each in a type, and period; 9 hours electives. Related Fields: SPCH 100 and 240.

Freshman Year		
ENGL 101—Composition	3	..
Social Science requirement	3	3
SPCH 100—Public Speaking	..	3
Foreign Language	3	3
Mathematics requirement	3 or 4	..
Science requirement	..	3 or 4
Physical Education	(1)	(1)
Elective	..	3
HLTH 105—Science and Theory of Health	(2)	..
Total	15 or 16	16 or 17

Sophomore Year		
ENGL 201; 202 or 211, 212 or 221, 222	3	3
SPCH 240—Oral Interpretation	..	3
History	3	3
Foreign Language	3	3
Science requirement	3 or 4	..
Fine Arts or Philosophy	3	..
Elective	..	3
Total	15 or 16	15

Junior Year		
EDUC 300—Human Development and Learning	..	6
ENGL 403 or 404 or 405	..	3
American Literature and English Literature	3	3
ENGL 481—Introduction to English Grammar	3	..
ENGL 493—Advanced Expository Writing	3	..
English (period)	..	3
English (type)	3	..
ENGL 482—History of the English Language	..	3
Free electives	3	..
Total	15	18

Senior Year		
EDSE 344—Curriculum, Instruction, and Observation	3	..
EDSE 330—Principles and Methods of Secondary Education	3	..
EDSE 453—The Teaching of Reading in the Secondary Schools	3	..
EDSE 364—Student Teaching in Secondary Schools	8	..
ENGL period (major figure)	..	3
EDUC 301—Foundations of Education	..	3
English electives	..	9
Total	17	15

FOREIGN LANGUAGE EDUCATION

The Foreign Language Education curriculum is designed for prospective foreign language teachers in elementary and secondary schools.

Elementary Education majors are required to have a minimum of 24 semester hours in the foreign language plus EDEL 323, Foreign Language Methods in the Elementary School. Foreign language majors and Secondary Education foreign language majors are also eligible for admission into the FLES program. Interested students should contact the Foreign Language Education advisor in the Department of Secondary Education for further information concerning the requirements of FLES teachers.

CLASSICAL LANGUAGE—LATIN

A minor for teaching Latin requires 24 prescribed semester hours based upon two years of high school Latin. These students should take LATN 203, 204, 305, 351, 352, 361, 401, 402. Students who have had four years of high school Latin should begin with LATN 305 and should select two additional courses from among LATN 403, 404, 405.

Prospective Latin teachers are urged to elect courses which relate to their teaching area: e.g., LATN 170; HIST 271; HIFN 456, 410, 411, 412; ARTH 260; CMLT 401; and ENGL 482.

MODERN FOREIGN LANGUAGES

All prospective foreign language teachers must take a minimum of 42 semester hours in the foreign languages including the following courses which are required for certification: one year of conversation, one year of advanced grammar and composition, one year survey of literature, one year of advanced literature (300 or 400 level) and one year of advanced civilization courses (300 or 400 level) or previously approved equivalents.

Prospective MFL teachers are urged to elect courses related to their teaching area and which will provide an integrated yet broad cultural background: e.g., LATN 170 and basic Latin courses; HIST 231, 232, and HIFN 455 (for Spanish majors); HIST 241, 242, 251, 252; HIFN 424, 425, 432 (for Russian majors); HIFN 444, 433 (for French majors); ARTH 260, 261; ECON 415, 418 (for Spanish majors); ECON 482 (for Russian majors); GVPT 452 (for Spanish majors); CMLT 401, 402.

It is recommended that students who plan to teach a foreign language contact the appropriate Foreign Language Education advisor early in their college career so that they can plan an integrated program of specialized, professional and liberal education.

SECONDARY FOREIGN LANGUAGE EDUCATION

Freshman Year	Semester I	Semester II
ENGL 101—Composition or alternate	3	..
ENGL 201—World Literature or alternate	..	3
Social Science requirement	3	3
Science or Mathematics requirements	3 or 4	3 or 4
SPCH 100—Public Speaking	3	..
HLTH 105—Science and Theory of Health	..	(2)
Physical Education	(1)	(1)
Intermediate Foreign Language (or appropriate level as certified by placement test)	3	3
Total	16 or 17	15 or 16
Sophomore Year		
ENGL 202—World Literature or alternate	3	..
History requirements	3	3
Science or Mathematics requirements	3 or 4	3 or 4
Fine Arts or Philosophy requirements	..	3
Foreign Languages—Conversation, Composition, or Literature	3	3
Electives (not in Foreign Languages)	3	3
Total	15 or 16	15 or 16
Junior Year		
EDUC 300—Human Development and Learning	6	..
Foreign Language—Composition and Style	3	3
Foreign Language—Literature	3	3
Foreign Language—Advanced Conversation	3	3
Electives	..	6
Total	15	15
Senior Year		
EDUC 301—Foundations of Education	..	3
EDSE 345—Curriculum, Instruction and Observation	3	..
EDSE 330—Principles and Methods of Secondary Education	3	..
EDSE 365—Student Teaching in the Secondary Schools	8	..
Elective from EDUC 440—Audio-Visual Education, EDMS 410—Educational Measurement, EDEL 425—The Teaching of Reading, EDSE 499T—Teaching English as a Second Language, EDSE 499 X-Bi-Lingual Education	2 or 3	..
Foreign Language—Advanced Literature (400 level)	..	6
Foreign Language 331, 332—Civilization*	..	3
Elective in Foreign Language or related area (e.g. Foreign Language, 300 or 400 level, History of France, Introduction Linguistics is recommended)	..	3 or 6
Total	16 or 17	15 or 18

* Courses in related disciplines may be substituted with permission of Adviser in College of Education.

HOME ECONOMICS EDUCATION

The Home Economics Education curriculum is designed for students who are preparing to teach home economics in the secondary schools. It includes study of each area of home economics and the supporting disciplines.

Fifteen hours of the total curriculum include an area of concentration which must be unified in content and which will be chosen by the student.*

Freshman Year	Semester I	Semester II
ENGL 101, 171—Composition or alternate	3	..
SOCY 100—Introduction to Sociology	3	..
FMCD 105—Introduction to Family Living	3	..
FOOD 110—Food and Nutr. of Indiv. and Fam. or NUTR 100—Elements of Nutrition	3	..
MATH requirement	3 or 4	..
PHED	(1)	(1)
EDSE 151—Freshman Seminar in Home Ec. Education	1	..
PSYC 100—Introduction to Psychology	..	3
APDS 101—Fundamentals of Design	..	3
ENGL—Literature	..	3
HLTH 105—Science and Theory of Health	..	(2)
TEXT 105—Textiles and Clothing In Contemp. Living	..	3
Total	17 or 18	15
Sophomore Year		
ENGL—Literature	3	..
History	3	..
CHEM 103—College Chemistry I	4	..
HSAD 240—Design and Furnishings in the Home or HSAD 241—Family Housing	3	..
SPCH 100—Public Speaking	3	..
EDSE 210—Sophomore Seminar in Home Economics Education	1	..
TXAP 221—Apparel I	..	3
History	..	3
CHEM 104—College Chemistry II	..	4
FOOD 200—Scientific Principles of Food	..	3
Fine Arts or Philosophy requirement	..	3
FMCD 250—Decision Making in Family Living	..	3
Total	17	19
Junior Year		
EDUC 300—Human Development and Learning	6	..
FOOD 260—Meal Management	3	..
FMCD 341—Personal and Family Finance or alternative	3	..
Area of concentration	3	..
EDSE 423A Fld Exp (Child Dev Lab)	1	..
FMCD 332—The Child in the Family or EDHD 411—Child Growth and Development	..	3
ECON 205—Fundamentals of Economics	..	3
EDSE 425—Problems in Teaching Home Economics	..	3
ZOOL 101 or MICB 200	..	4
Area of concentration	..	3
Total	16	16
Senior Year		
EDSE 347—Curriculum, Instruction & Observation**	3	..
EDSE 330—Principles & Methods of Secondary Education**	3	..
EDSE 370—Student Teaching in Secondary Schools: Home Economics**	8	..
FMCD 344—Resident Experience in Home Management or FMCD 345D—H.M. Practicum	3	or 3 ..
FMCD 260—Family Relations or SOCY 443 The Family and Society	..	3

EDUC 301—Foundations of Education ...	..	3
Area of Concentration*	..	9
Total	14-17	15-18

* Area of Concentration: 15 semester hours.
A) Including maximum of two home economics courses, with the remainder of the 15 hours in supporting behavioral, physical and biological sciences, philosophy, special education, or human development.
B) Of the 15 hours, nine must be upper division.
** Student teaching block.

MATHEMATICS EDUCATION

A major in mathematics requires the completion of MATH 241 or its equivalent and a minimum of 15 semester hours of mathematics courses at the 400 level. These 400 level courses must include MATH 403, 450 and one of the geometry courses, 430 or 437. The remainder of the courses in mathematics are to be selected with the approval of the advisor. The major must be supported by one of the following science sequences: CHEM 103 and 104; PHYS 181 and 182 or 221 and 222 or 161 and 262; BOTN 100 and three hours in BOTN courses for which BOTN 100 is a prerequisite; two courses chosen from ZOOL 101, 102, 290, 246, 201 or equivalent; ASTR 110 and 180 and three more hours of astronomy (not including ASTR 100 or 105); MICB 200 plus three hours of microbiology courses.

Freshman Year		
SPCH 100—Public Speaking	3	..
ENGL 101—Composition or alternate	..	3
Fine Arts and Philosophy requirement	..	3
Social Science requirement	3	3
MATH 115, 140—Introductory Analysis and Analysis I	3	4
HLTH 105—Science and Theory of Health	(2)	..
Physical Education —Physical Activities	(1)	(1)
Electives	3	3
Total	15	17
Sophomore Year		
ENGL 201, 202—World Literature or alternate	3	3
History requirement	3	3
Science requirement	4	4
MATH 141, 240—Analysis I and Linear Algebra	4	4
Electives	3	3
Total	17	17
Junior Year		
MATH 241—Analysis IV	4	..
MATH 403—Introduction to Abstract Algebra	..	3
Math. electives, including Geometry requirement	3	3
EDUC 300—Human Development and Learning	..	6
Electives	9	3
Total	16	15
Senior Year		
EDSE 330—Principles and Methods of Secondary Education	3	..
EDSE 350—Curriculum, Instruction, and Observation—Mathematics	3	..
EDSE 372—Student Teaching in Secondary Schools—Mathematics	8	..
Education elective	3	..
MATH 450—Fundamental Concepts of Mathematics	..	3
Math. elective	..	3
EDUC 301—Foundations of Education ...	..	3
Electives	..	6
Total	17	15

MUSIC EDUCATION

The curriculum in music leads to a Bachelor of Science degree in education with a major in music education. It is planned to meet the growing demand for specialists, supervisors and resource teachers in music in the schools. The program provides training in the teaching of vocal and instrumental music and leads to certification to teach music at both elementary and secondary school levels in Maryland and many other states. There are two options. The vocal option is for students whose principal instrument is voice or piano; the instrumental option is for students whose principal instrument is an orchestral instrument.

All students are carefully observed at various stages of their programs by members of the Music Education faculty. This is intended to insure the maximum development and growth of each student's professional and personal competencies. Each student is assigned to an advisor who guides him through the various stages of advancement in the program of music and music education.

INSTRUMENTAL OPTION

	Semester I	Semester II
Freshman Year		
MUSC 108, 109—Applied Music (principal instr.)	2	2
MUSC 131—Introduction to Music	3	..
MUSC 150, 151—Theory of Music	3	3
MUSC 101, 103—Class Piano	2	2
ENGL 101—Composition or alternate	..	3
SPCH 110—Voice and Diction	3	..
Social Science requirements	3	3
MATH 105—Fundamentals of Mathematics or MATH 110—Introduction to Mathematics	..	4 or 3
Total	16	17 or 16
MUSC 129G—Orchestra or MUSC 129—Band	(1)	(1)
HLTH 105—Science and Theory of Health	(2)	..
Physical Education	(1)	(1)
Sophomore Year		
MUSC 208, 209—Applied Music (principal instr.)	2	2
MUSC 250, 251—Advanced Theory of Music	4	4
MUSC 113, 114, 116, 117—Class Study of Instruments (3-4 courses)	2 or 4	2 or 4
ENGL 201, 202—World Literature or alternates	3	3
Biological Science requirement	4	..
Physical Science requirement	..	3
Total	15 or 17	14 or 16

MUSC 229G—Orchestra or MUSC 229I—Band	(1)	(1)
MUSC 129—Chamber Music Ensemble elective)	(1)	(1)
Junior Year		
MUSC 408, 409—Applied Music (principal instr.)	2	2
MUSC 330, 331—History of Music	3	3
MUSC 490, 491—Conducting	2	2
MUSC 120, 213—Class Study of Instruments (2 or 3 courses)	2	4 or 2
MUED 410—Methods of Class Instrumental Instruction	..	2
MUED 470—Music in Secondary Schools	2	..
EDUC 300—Human Development and Learning	6	..
Elective	..	3
Total	17	16 or 14
MUSC 329G—Orchestra or MUSC 329I—Band	(1)	(1)
MUSC 329—Chamber Music Ensemble (elective)	(1)	(1)
Senior Year		
MUSC 418—Applied Music (principal instr.)	2	..
MUSC 100—Class Voice	2	..
MUSC 486—Orchestration	2 or 3	..
MUED 420—Band and Orchestra Techniques and Administration	..	2
EDSE 373, EDEL 335—Student Teaching	..	8
EDUC 301—Foundations of Education	3	..
EDSE 330—Principles and Methods of Secondary Education	3	..
History requirement	3	3
Total	15 or 16	13
MUSC 329G—Orchestra or MUSC 329I—Band	(1)	(1)
Musc 329—Chamber Music Ensemble (elective)	(1)	(1)

VOCAL OPTION

Freshman Year		
MUSC 108, 109—Applied Music (principal instr.)	2	2
MUSC 131—Introduction to Music	3	..
MUSC 150, 151—Theory of Music	3	3
MUSC 100—Class Voice MUSC 099B, Applied Music (voice)—MUSC 102, 103—Class Piano	2	2
ENGL 101—Composition or alternate	..	3
SPCH 110—Voice and Diction	3	..
Social Science requirement	3	3
MATH 105—Fundamentals of Mathematics or MATH 110—Introduction to Mathematics	..	4 or 3
Total	16	17 or 16
MUSC 129A—Men's Glee Club, MUSC 129B—Women's Chorus, MUSC 129—Chamber Ensemble, or MUSC 129C— University Choir	(1)	(1)
HLTH 105—Science and Theory of Health	(2)	..
Physical Education	(1)	(1)
Sophomore Year		
MUSC 208, 209—Applied Music (principal instr.)	2	2
MUSC 200, 201—Advanced Class Voice	2	2
MUSC 202, 203—Advanced Class Piano	2	2
MUSC 250, 251—Advanced Theory of Music	4	4
ENGL 201, 202—World Literature or alternates	3	3
Biological Science requirement	4	..
Physical Science requirement	..	3
Total	17	16
MUSC 229A—Men's Glee Club, MUSC 229B—Women's Chorus, MUSC 229—Chamber Music Ensemble, or MUSC 229C— University Choir	(1)	(1)
Junior Year		
MUSC 408, 409—Applied Music (principal instr.)	2	2
MUSC 110—Class Study of String Instruments, 111—Class Study of Wind Instruments	2	2
MUSC 330, 331—History of Music	3	3
MUSC 490, 491—Conducting	2	2
MUED 462—Music for the Elementary School Specialist	2	..
MUED 470—Music in Secondary Schools	..	2
EDUC 300—Human Development and Learning	..	6
Elective	3	..
Total	14	17
MUSC 329A—Men's Glee Club, MUSC 329B—Women's Chorus, MUSC 329—Chamber Music Ensemble, or MUSC 329C—University Choir	(1)	(1)
Senior Year		
MUSC 410—Applied Music (principal instr.)	2	..
MUED 480—The Vocal Music Teacher and School Organization	2	..
MUED 472—Methods and Materials in Vocal Music for Secondary Schools	..	2
EDSE 330—Principles and Methods of Secondary Education	3	..
EDUC 301—Foundations of Education	..	3
EDSE 372, EDEL 335—Student Teaching	4	4
History requirement	3	3
Total	14	12
MUSC 329A—Men's Glee Club, MUSC 329B—Women's Chorus, MUSC 329—Chamber Music Ensemble, or MUSC 329C—University Choir	(1)	(1)

PHYSICAL EDUCATION AND HEALTH EDUCATION

This curriculum is designed to prepare students for teaching physical education in elementary and secondary schools. To obtain full particulars on course requirements, the student should refer to the sections on the Department of Physical Education and the Department of Health Education.

SCIENCE EDUCATION

A science major consists of 52 semester hours study in the academic sciences.

The following courses are required for all Science Education majors: BOTN 100; CHEM 103; CHEM 104; PHYS 121, 122 or 221, 222 or ZOOL

101; and a year of mathematics. Additional courses are selected from the academic sciences, with the approval of the student's advisor, so as to provide a minimum of 36 hours in a particular science teaching area, e.g., biology, chemistry, physics, and earth sciences, as noted below.

Preparation for biology teaching will include BOTN 202; ZOOL 102; MICB 200; genetics (ZOOL 246 or BOTN 414); Human Anatomy and Physiology (ZOOL 201 and/or 202); a field course in both Botany and Zoology (BOTN 212, 462-464, or 417; ZOOL 470, 480 or ENTM 200); CHEM 201, 202.

Preparation for chemistry teaching will include CHEM 103, 104, 201, 202, 203, 204, 481, 482, 498 and upper division courses such as CHEM 321, 401, 403, 421, 440, 461. Math preparation should include MATH 115, 140, 141. MATH 240 and 241 or 246 are also recommended.

Preparation for physics teaching will include math through at least MATH 240, with 241 and 246 also recommended. Physics courses will include introductory physics with calculus (PHYS 221, 222), lab courses (PHYS 285, 286), Intermediate Theoretical Physics 404, 405, and Modern Physics (PHYS 420). In addition, a physics teacher should take course work in Astronomy (110, 180). Participation in PSSC or Harvard Project Physics courses (when offered) would be desirable.

Preparation for earth science teaching will include one year of biology (BOTN 100 and ZOOL 101), one year of chemistry (CHEM 103 and 104), one year of physics (PHYS 221, 222 preferred), MATH 115 and 140, and at least 30 hours of earth sciences with 18 hours concentration in one of the earth science fields and six hours minimum in each of two other earth science areas: GEOL 100, 102, 110, 421, 422, 431, 441, 460, 489, 499; ASTR 100 and 105, 110, 180, 410, 498; GEOG 440, 445, 446, 441, 370, 372, 462.

	Semester I	Semester II
Freshman Year		
ENGL 101—Composition	3	..
BOTN 100—General Botany	4	..
CHEM 103, 104—General Chemistry	4	4
MATH 115—Introductory Analysis, MATH 140—Analysis, MATH 110, 111	3	4
Physical Education	(1)	(1)
ZOOL 101—General Zoology	..	4
HLTH 105—Science and Theory of Health	..	(2)
Total	15	15
Sophomore Year		
English Literature	3	3
History requirement	3	3
PHYS 121, 122—Fundamentals of Physics, or PHYS 221, 222—General Physics: Mechanics, Heat and Sound, or PHYS 161, 262, 263	4 or 5	4 or 5
Science	3 or 4	3 or 4
Arts or Philosophy requirement	..	3
SPCH 100—Public Speaking	3	..
Total	16 or 18	16 or 18
Junior Year		
EDUC 300—Human Development and Learning	..	6
Science and Mathematics	12	9
General Education requirements	3	3
Total	15	18
Senior Year		
EDSE 352—Curriculum, Instruction, and Observation	..	3
EDSE 330—Principles and Methods of Secondary Education	..	3
EDSE 375—Student Teaching in the Secondary Schools	..	8
EDUC 301—Foundations of Education	3	..
Science and Mathematics	12	..
Total	15	14

SOCIAL STUDIES EDUCATION

OPTION I (HISTORY CONCENTRATION)

Requires 54 semester hours of which at least 27 must be in history, including HIST 221, 222, 241, 242 and 12 hours of 300 or 400-level history courses including HIST 389; 30 hours of related social sciences as outlined below:

At least one course in each of the following areas: geography, sociology, (or ANTH 101) government and politics, and two courses in economics. Fifteen semester hours of social science electives are required of which nine hours must be in the 300 or 400 level. These courses may be selected from any one or combination of relevent fields. The selection of the courses or fields are at the discretion of the adviser as a defensible area of study.

OPTION II (GEOGRAPHY CONCENTRATION)

Requires 27 semester hours in geography and 30 semester hours in history and social science. The geography requirements are GEOG 201, 202, 203, 490, 6 hours of upper-division systematic geography, and 3 hours of regional geography. The history and social science requirements are: SOCY 100 (or ANTH 101), ECON 110 and 205, GVPT 110, HIST 221, 222, plus two 300 or 400 level history electives. Either option must include one course concerning ethnic or cultural minorities.

	Semester I	Semester II
Freshman Year		
ENGL 101—Composition	..	3
SPCH 100—Public Speaking	3	..
Foreign Languages	3	3
Mathematics requirement	3 or 4	..
Science requirement	..	3 or 4
HIST 221, 222—History of The United States to 1865, History of The United States since 1865	3	3
Fine Arts or Philosophy requirement	..	3
HLTH 105—Science and Theory of Health	(2)	..
Physical Education	(1)	(1)
Total	15 or 16	16 or 17

Sophomore Year		
English Literature	3	3
HIST 241, 242—Western Civilization	3	3
GEOG 100—Introduction to Geography	3	..
GVPT 170—American Government	..	3
Science requirement	3 or 4	..
Foreign Languages	3	3
SOCY 100—Introduction to Sociology (or ANTH 101)	3	..
ECON 110—Economic Developments	..	3
Total	18 or 19	15
Junior Year		
ECON 205—Fundamentals of Economics	3	..
History electives	3	3
EDUC 300—Human Development and Learning	..	6
History elective (300 or 400 level)	6	3
Social Science electives	3	3
Total	15	15
Senior Year		
EDUC 301—Foundations of Education	3	..
HIST 389—Proseminar in Historical Writing	3	..
Social Science electives	6	..
Electives	3	..
EDSE 353—Curriculum, Instruction and Observation	..	3
EDSE 330—Principles and Methods of Secondary Education	..	3
Elective from EDMS 410; EDUC 440; EDSE 453, 499	..	3
EDSE 376—Student Teaching in Secondary Schools	..	8
Total	15	17

SPEECH EDUCATION

A major in speech requires 37 semester hours. It is the policy to build a program of study in anticipation of the needs of prospective teachers in the communication field of speech and drama. The following speech courses are required: SPCH 100, 200, 110, 220, 350, 325, DART 120, and SPHR 302, plus 15 hours of electives in speech and drama. A teaching minor in English is also recommended. Students desiring a Bachelor of Arts degree also must meet departmental foreign language requirements.

	Semester I	Semester II
Freshman Year		
SPCH 100—Public Speaking	3	..
English Composition	3	..
Social Science requirements	3	3
RATV 124	..	3
Science requirement	3	3
English Literature	3	..
SPCH 110—Voice and Diction	..	3
History requirement	..	3
Physical Education	(1)	(1)
HLTH 105—Science and Theory of Health	(2)	..
DART 110—Introduction to the Theatre	..	3
Total	18	19
Sophomore Year		
English Literature	3	..
SPCH 200—Advanced Public Speaking	..	3
SPCH 220—Group Discussion	..	3
Science requirement	3	..
DART 120—Acting	3	..
SPCH 350—Fundamentals of Speech Communication	3	..
MATH 105—Fundamentals of Mathematics	..	4
History requirement	..	3
Minor requirement	..	3
General elective	3	..
Total	15	16
Junior Year		
DART 311—Play Production	..	3
EDUC 300—Human Development and Learning	6	..
SPHR 302—Handicapped School Children	3	..
Speech electives	3	3
Minor requirements	3	6
SPCH 325—Parliamentary Law	1	..
General electives	..	6
Total	16	18
Senior Year		
DART 330—Play Directing	3	..
EDSE 354—Curriculum, Instruction, and Observation	..	3
EDSE 330—Principles and Methods of Secondary Education	..	3
Elective from EDMS 410, EDUC 440, EDSE 453	..	3
EDSE 377—Student Teaching in Secondary Schools	..	8
SPCH 230—Debate	3	..
Minor requirements	6	..
EDUC 301—Foundations of Education	3	..
General elective	3	..
Total	18	17

Course Code Prefix—EDSE

SOCIOLOGY

Associate Professor and Acting Chairman: Federico.
Professors: Dager, Janes, Lejins.*
Associate Professors: Cussler, Henkel, Hirzel, McIntyre, Meeker, Pease.
Assistant Professors: Finsterbusch, Franz, Greisman, Harper, Hornung, J. Hunt, L. Hunt, Kruegel. Lengermann, Mortimer, M. Pate, T. Pate, Schwartz, Simons.
Lecturer: Richardson.
Instructors: Hughes, Slan, Weakland.

The major in sociology offers: (1) a liberal education especially directed toward understanding the complexities of modern society and its social problems; (2) a broad preparation for various types of professions, occupations and services dealing with people; (3) preparation of qualified students for graduate training in sociology.

A minimum of 30 hours in sociology is required of majors. Required courses include SOCY 200, SOCY 201, SOCY 202, SOCY 203. Twelve hours of course work in sociology must be at the 300-400 level. In addition, MATH 110 or higher is required of majors.

*Joint appointment with the Institute of Criminal Justice and law Enforcement.

SPANISH AND PORTUGUESE LANGUAGES AND LITERATURES

Professor and Chairman: Hesse.
Professors: Goodwyn, Gramberg, Marra-Lopez, Mendeloff, Nemes, Parsons (Emeritus), Rand (Emerita).
Associate Professor: Rovner.
Assistant Professors: DeLorenzo, Natella, Norton, Sosnowski.
Lecturers: Igel, Rentz.
Instructors: Barilla, Borroto, Diz, Garcia, Lesman Sendra, Wooldridge.

MAJORS

Two types of undergraduate majors are offered in Spanish: one for the general student or the future teacher, and the other for those interested in a rounded study of a foreign area for the purpose of understanding another nation through its literature, history, sociology, economics, and other aspects. Both of these majors confer the B.A. degree.

An undergraduate major in either language and literature or area studies requires a total of 39 hours with a C average, above the basic foreign language requirement.

LANGUAGE AND LITERATURE MAJOR

Courses: SPAN 201, 221, 301-302; 311 or 312, 321-322 or 323-324; 401 or 402 plus five courses on the 400 level in literature (one of which may be elected outside of the field of literature) for a total of 39 hours.

Twelve hours of supporting courses, two of which must be on the 300-400 level in a single department other than the major and education. Suggested areas: government and politics, art, history, philosophy and comparative literature, etc., for a combined total of 51 hours.

FOREIGN AREA MAJOR

The area study major in Spanish endeavors to provide the student with the knowledge of the various aspects of Spain and Spanish America. Specific requirements in this major are SPAN 201, 301-302, 311-312, 321-322 or 323-324, 424-425 or 446-447, and four semester courses in Spanish literature numbered 408-498, for a total of 39 hours.

Twelve hours of supporting courses, six of which must be on the 300-400 level in a single department other than the major and education. Suggested areas: economics, government and politics, geography, history, philosophy, etc., for a combined total of 51 hours.

HONORS IN SPANISH

A student whose major is Spanish and who, at the time of application, has a general academic average of 3.0 and 3.5 in his major field may apply to the Chairman of the Honors Committee for admission to the Honors Program of the department. Honors work normally begins in the first semester of the junior year, but a qualified student may enter as early as the sophomore year or as late as the second semester of the junior year. Honors students are required to take two courses from those numbered 491, 492, 493 and the seminar numbered 496, as well as to meet other requirements for a major in Spanish. There will be a final comprehensive examination covering the honors reading list, which must be taken by all graduating seniors who are candidates for honors. Admission of students to the Honors Program, their continuance in the program, and the final award of honors are the prerogative of the Departmental Honors Committee.

ELEMENTARY HONORS

Course 102H in Spanish is limited to specially approved candidates who have passed course 101 with high grades, and will allow them to enter 104H or 201.

LOWER DIVISION COURSES

The elementary and intermediate courses in Spanish consist of three semesters of four credits each (101, 102, 104). The language requirement is satisfied by passing 104 or equivalent.

Spanish 101 may be taken for credit by those students who have had two or more years of Spanish in high school, provided there has been a lapse of at least four years between the date of their last high school course in Spanish and the date of their first Spanish course at the University.

Transfer students with college credit have the option of continuing at the next level of study, or of taking a placement examination, or of electing courses 103 or 104. If a transfer student takes course 103 for credit, he retains transfer credit *only* for the equivalent of course 101. A transfer student placing lower than his training should warrant may ignore the placement but DOES SO AT HIS OWN RISK. If he takes 104 for credit, he retains transfer credit for the equivalent of courses 101 and 102.

A student whose native language is Spanish or Portuguese may not use either language to satisfy the Arts and Sciences language requirement.

If a student has received a D in a course, advanced and completed the next higher course, he cannot go back and repeat the original D.

Courses Code Prefix—SPAN, PORT

SPECIAL EDUCATION

Faculty: Samuel C. Ashcroft, Joan Goodman, Jean R. Hebeler, Mildred Holt, Linda Jacobs, William Porter, Margaret Rogers, Eric Seidman, Betty H. Simms, Peter Valletutti.

The Special Education Department offers an un-

dergraduate program which prepares students for a teaching position in either an elementary or secondary level special education program. Students who complete the undergraduate program receive the Bachelor of Science degree and meet Maryland State Department of Education requirements for the standard professional certificate in special education.

Students at the undergraduate level pursue a sequential program in the broad area of learning differences, concentrating either in the area of the mentally retarded on learning disabilities (perceptually impaired). Progress through the program is dependent upon the student's achieving the requisite special teaching competencies required for graduation. Field experiences are required of all students in the department prior to their student teaching experiences. An area of supporting academic content consisting of 15 credit hours beyond the General Education Requirement is included in each student's program. This supporting academic content may be developed in and among the areas of psychology, sociology, anthropology, and hearing and speech.

A minimum of 129 semester hours plus the four required hours in health and physical education are necessary for graduation.

Each upper level undergraduate student is assigned a faculty advisor. The student consults with his advisor regarding specific details of his program, alternatives, etc. The following represents a "typical" program.

	Semester I	Semester II
Freshman Year		
ENGL 101—Composition or alternate	3	..
English Literature	..	3
PSYCH 100—Introduction to Psychology	..	3
SOCY 100—Introduction to Sociology	3	..
GEOG 100—Introduction to Geography	..	3
ARTE 100—Fundamentals of Art Education	3	..
MUSC 155—Fundamentals for the Classroom Teacher	..	3
Biological Sciences	3 or 4	..
Physical Education	(1)	(1)
HEALTH	(2)	..
FINE ARTS (Art, Dance, Music, Philosophy)	..	3
	15 or 16	16
Sophomore Year		
English Literature	3	..
U. S. History	3	..
History	..	3
Physical Science	3 or 4	..
SCIENCE (Physical or Biological)	..	3 or 4
MATH 210—Elements of Mathematics	4	
MATH 211—Elements of Geometry	..	4
SPHR 202—Fundamentals of General American Speech or SPCH 100— Public Speaking, or SPCH 110—Voice and Diction	..	3
Academic Content or elective	3	3
EDSP 288—Special Problems in Special Education	1	..
	17 or 18	16 or 17
Junior Year		
HISTORY	..	3
EDUC 300—Human Development and Learning	6	..
EDEL 302—Science in the Elementary School	2	..
EDEL 326—The Teaching of Reading	..	2
EDEL 305—Language Arts in the Elementary School	..	2
EDEL 307—Social Studies in the Elementary School	..	2
EDEL 314—Mathematics in the Elementary School	2	..
EDSP 470—Introduction to Special Education	3	..
EDSP 471, 491—Characteristics of Exceptional Children 471—Mentally Retarded or 491—Learning Disabilities (Perceptually Impaired)	..	3
EDSP 472, 492—Education of Exceptional Children 472—Mentally Retarded or 492—Learning Disabilities (Perceptually Impaired	..	3
Electives, Supporting Academic Content	3	..
	16	15
Senior Year		
EDUC 301—Foundations of Education	3	..
PHED 420—Physical Education in the Elementary Schools (3) or MUED 352—Music for the Elementary Classroom Teacher (2) or EDEL 412—Art in the Elementary School (2)	2 or 3	..
EDSP 473, 483—Curriculum for Exceptional Children		
EDEL 333—Student Teaching in the Elementary School	..	8
EDSP 349—Student Teaching of Exceptional Children	..	8
Electives, Supporting Academic Content	9	..
	14 to 15	16

Course Code Prefix—EDSP

SPEECH AND DRAMATIC ART

Acting Chairman: Linkow.
Professors: Aylward, Pugliese.
Associate Professors: Kirkley, Linkow, O'Leary, Meersman, Niemeyer, Vaughan.
Assistant Professors: Croft, Falcione, Jamieson, Onder, Provensen, Starcher, G. S. Weiss, Wolvin, Zelenka.
Instructors: Berdan, Blum, Carter, Caudill, Cokely, Cusmano, Doyle, DuMonceau, Elliott, M. Harris, P. Harris, Helfand, Karr, Klann, Lea, McCleary, Maynard, Mosbo, Paver, Pearson, Rosenthal, Smulowitz.
Assistant Instructor: Todd.
Lecturers: Abrams, Hawkins, Hoachlander, Niles, Kraus, Read, Schikert, F. Weiss, M. Weiss.

The departmental curricula lead to the Bachelor of Arts degree and permit the student to develop a program with emphasis in one of the three areas of the department: (1) Speech communication (political communication, organizational communication, urban communication, educational communication, and interpersonal communication), (2)

Dramatic art (educational theater, acting, directing, producing, theater history, and technical theater), (3) Radio-television-film (broadcasting, programming, directing, broadcast law and regulation, international broadcasting, film production, and contemporary cinema). In cooperation with the Department of Secondary Education, the department provides an opportunity for teacher certification in the speech and drama education program.

The curriculum is designed to provide: (1) a liberal education through special study of the arts and sciences of human communication, (2) preparation for numerous opportunities in business, government, media and related industries, and education.

Since communication is a dynamic field, the course offerings are under constant review and development, and the interested student should obtain specific information about a possible program from a departmental advisor.

The major requirements are: 30 hours of course work in any of the divisions exclusive of those courses taken to satisfy University or Divisional requirements. Of the 30 hours, at least 15 must be upper division, in the 300 or 400 series. No course with a grade less than C may be used to satisfy major requirements.

Each of the possible concentrations in the department requires certain courses in order to provide a firm foundation for the work in that area. Specific information about these course requirements and course options for the supporting (minor) program should be obtained from an advisor in the particular area.

The department offers numerous specialized opportunities for those interested through co-curricular activities in theater, film, television, readers' theatre, debate and forensics. For the superior student an Honors Program is available, and interested students should consult their advisor for further information no later than the beginning of their junior year.

Course Code Prefixes—SPCH, DART, RATV

TEXTILES AND CONSUMER ECONOMICS

Professor and Chairman: Smith.
Professor: Dardis.
Visiting Professor: Fourt.
Associate Professor: Buck.
Visiting Associate Professor: Clark.
Assistant Professors: Block, Heagney, Spivak, Wilbur (Emeritus).
Visiting Assistant Professor: Thain.
Instructors: Marro, Mihelcic, Pledger.
Lecturer: Hacklander.

Students may select one of four majors. Each offers diverse professional opportunities. Through supportive courses students add to their major studies a concentration of work in an allied area such as art, business, economics, family services, journalism, sciences, or speech and dramatic art.

In the *textile science* major emphasis is placed on the scientific and technological aspects of the field. Graduates will be qualified for employment in many facets of the textile industry including research and testing laboratories, consumer technical service and marketing programs, and in buying and product evaluation.

In the *textiles and apparel major* emphasis is placed on the cultural, economic and professional aspects of the field. Students are prepared for careers in fashion merchandising and promotion, instruction and demonstration with business and educational organizations, fashion designing, consumer services, and technical or managerial positions with a clothing manufacturer.

Graduates of the *textile marketing* major will be qualified for careers in business where they will function as communicators between the textile producer and consumer in merchandising and fashion promotion, in consumer education programs and in textile production promotion and development.

Graduates completing the major in *consumer economics* will be able to provide liaison between the consumer and producers and distributors of goods and services utilized directly by families and may work in consumer education programs, in marketing and consumer relation divisions in business and industry, or in government agencies providing consumer services.

A department Honors Program permits outstanding undergraduates to explore in depth on an individual basis a program of work which will strengthen their undergraduate program and their professional interests. Students selected for the program must have a "B" average or better to be considered. Students in the honors program participate in a junior honors seminar and present a senior thesis.

Freshman Year (Common To All Majors)

English Requirement	3	3
Math 110 or 115	3-4	..
Sociology 100	3	..
Speech 107 or 100	..	2-3
HUMAN ECOLOGY Core Course	..	3
Textiles in Contemporary Living TEXT 105	3	..
Physical Science (CHEM 103, 104 or 105, 106)	4	4
Health 105	..	(2)
Physical Education	(1)	(1)
	17-18	15-16

TEXTILES AND APPAREL

Sophomore Year		Semester Hours
English Requirement	3	..
Economics 201 and 203	3	3
Psychology 100	..	3
College Core Course (APDS 101)	3	..
Apparel I & II TXAP 221 & 222	3	3
Introduction to Textile Materials TEXT 150	3	..

Textile Materials: Evaluation and Characterization TEXT 250		3
Elective		3
	15	15
Junior Year		
HUMAN ECOLOGY Core Course		3
Apparel Design: Draping TXAP 420 or Apparel Design: Experimental Processes TXAP 425		3
Textile Science: Chemical Structure and Properties of Fibers TEXT 452 or Environmental Textiles TEXT 355		3
History		3
Fine Arts Requirement		3
Marketing BSAD 350		3
HUMAN ECOLOGY Core Course		6
Electives		6
		30
Senior Year		
TXAP 441—Clothing and Human Behavior or CNEC 437—Consumer Behavior		3
TEXT 465—Economics of the Textile and Apparel Industries or CNEC 435—Economics of Consumption		3
History		3
HUMAN ECOLOGY Core Course		3
Electives		20
		32

TEXTILE MARKETING

Sophomore Year		Semester Hours
English Requirement	3	..
Economics 201 and 203	3	3
Psychology 100	..	3
HUMAN ECOLOGY Core Course (APDS 101)	3	..
TXAP 221 and 222 or Home Economics Electives	3	3
Introduction to Textile Materials TEXT 150	3	..
Textile Materials: Evaluation and Characterization TEXT 250		3
Elective		3
	15	15
Junior Year		
HUMAN ECOLOGY Core Course		3
Textile Science: Chemical Structure and Properties of Fibers TEXT 452 or Environmental Textiles TEXT 355		3
Fine Arts Requirement		3
History		6
Marketing BSAD 350		3
Journalism 341, 330, 371, 331 (or alternative)		3
RATV 315 (or alternative)		3
Electives		6
		30
Senior Year		
Clothing and Human Behavior TXAP 441 or Consumer Behavior CNEC 437		3
Economics of the Textile and Apparel Industries TEXT 465		3
Statistics BSAD 230		3
BSAD 352, 450 or 452		3
Electives		20-21
		32-33

TEXTILE SCIENCE

Sophomore Year		Semester Hours
English 202	3	..
HUMAN ECOLOGY Core Course		3
Psychology 100		3
Introduction to Textiles TEXT 150	3	..
Textile Materials: Evaluation and Characterization TEXT 250		3
Chemistry 201, 202, 203, 204 or 211, 212, 213, 214	5	5
Math 140, 141 or 110, 111	3-4	3-4
	14-15	17-18
Junior Year		
Fine Arts Requirement		3
Physics 121, 122 or 161, 262		7-8
Textile Science: Chemical Structure and Properties of Fibers TEXT 452		
HUMAN ECOLOGY Core Course		3
Sociology 100		3
Statistics		3
Economics 201 and 203		6
Electives		6
		31-32
Senior Year		
Textile Science: Finishes TEXT 454 or Textile Science: Chemistry and Physics of Fibers and Polymers TEXT 456		3
Economics of the Textile and Apparel Industries TEXT 465 or Economics of Consumption CNEC 435		3
History		6
Electives		18
		30

CONSUMER ECONOMICS

Sophomore Year		Semester Hours
English Requirement	3	..
Economics 201 and 203	3	3
Psychology 100	..	3
HUMAN ECOLOGY Core Course (FOOD 110 or NUTR 100)	3	..
Family Housing HSAD 241	..	3
HUMAN ECOLOGY Core Course (HSAD 241)	3	..
Math 111 or 140 or Statistics BSAD 230	3-4	..
Consumer Product Information	..	3
Elective (Math 141 for students completing this math sequence)		3-4
Elective		3
	15-16	18-19
Junior Year		
Economics of Consumption CNEC 435		3
Fine Arts Requirement		3
Consumer Product Information		6
Statistics BSAD 230 or 330		3
Economics 401 and 403		6
Electives		9
		30
Senior Year		
Consumer Behavior CNEC 437		3
The Consumer and the Law CNEC 431		3
History		6
Marketing BSAD 350		3
Electives		17
		32

Course Code Prefixes—TEXT, TXAP, CNEC

URBAN STUDIES PROGRAM

Professor and Director: Thomas P. Murphy.
Professors: Harper, Janes, Kidd.
Assistant Professors: Chaples, Groves.
Lecturers: Colman, Shanley.

This interdisciplinary program is designed for

students interested in government and other public service careers and graduate study in urban affairs, as well as for students who wish to understand urban society. The faculty is drawn from six colleges and schools of the University. The B.A. in Urban Studies degree can be given by any of the colleges or schools on campus which wish to participate in the program.

The program assumes a comprehensive approach to urbanism and includes attention to the total metropolitan area, including suburbs as well as central cities, their interrelationship, and state and federal policy. In addition to an interdisciplinary or multi-disciplinary staff, the program will be characterized by students from a variety of disciplines, a wide variety of research projects, and a set of "core" seminars dealing with cities or urbanization as they involve economic factors, social problems, political and governmental activities, and environmental and physical aspects. Contemporary urban problems will be emphasized and modern methodological and analytical techniques will be dealt with. The program assumes that cities and urbanization are complex and require the knowledge and intellectual skills of many different disciplines.

REQUIREMENTS

In general, for a Bachelor's degree in Urban Studies, a student should register in a college or school, satisfy university and college or school requirements, and complete course work in urban and urban-oriented subject matter.

The major in Urban Studies requires 42 credits:

15 in URBS *core courses*
15 in urban oriented courses within a department or program selected as a *disciplinary urban specialization.*
12 within one of three *basic fields* and from at least two departments.

The URBS *Core Courses* include the following:

URBS 210—Survey of the Field and Urban Studies
URBS 320—The City and the Developing National Culture of the United States
URBS 350—Introduction to Urban Field Study
URBS 395—Pro-Seminar in Urban Literature
URBS 399—Independent Study in Urban Topics
URBS 430—Practicum in the Urban Community and Urban Organizations
URBS 480—Urban Theory and Simulation

The prerequisites for these core courses are nine hours selected from 100 and 200 level courses in Architecture, Business Administration, Economics, Education, Geography, Government and Politics, History, Journalism, and Sociology.

Departments and programs currently offering sufficient urban oriented courses for the *disciplinary urban specialization* include: Afro-American Studies, Agricultural and Extension Education, Agricultural and Resource Economics, American Studies, Anthropology, Architecture, Business Administration, Chemical Engineering, Chemistry, Civil Engineering, Computer Science, Criminal Justice and Criminology, Economics, Education, English, Family and Community Development, Geography, Government and Politics, Health, History, Information Systems Management, Journalism, Meteorology, Physical Sciences, Psychology, Recreation, and Sociology.

The three *basic fields* and the departments whose courses meet the requirements are:

1. Social-economic-behavioral:
   Afro-American Studies, Agricultural and Extension Education, Agricultural and Resource Economics, Architecture, Business Administration, Criminal Justice and Criminology, Economics, Education, Family and Community Development, Cultural Geography, Government and Politics, Health, Information Systems Management, Journalism, Psychology, Recreation, and Sociology.
2. Physical-environmental:
   Chemical Engineering, Chemistry, Civil Engineering, Computer Science, Physical Geography Geology, Health, Landscape, Architecture, Meteorology, Physical Sciences.
3. Historical-cultural-humanistic:
   Afro-American Studies, American Studies, Anthropology, Architecture, Education, English, History, Journalism, Recreation, and Sociology.

Course Code Prefix—URBS

ZOOLOGY

Professor and Chairman: Corliss.
Professor and Assistant Chairman: Haley.
Professors: Anastos, Brown, Grollman, Jachowski, Schleidt.
Research Professors: Eisenberg,* Flyger,* Glinos,* Otto.*
Associate Professors: Barnett, Brinkley, Clark, Contrera, Highton, Levitan, Linder, Morse, Potter, Ramm, Small.
Assistant Professors: Allan, Gill, Golmon, Goode, Imberski, Morton, Pierce, Rees, Strathmann, Vermeij, Woodin.
Instructors: Danstedt, Knox, Korr, Montviloff, Moore, Neidhardt, Piper, Rabin, Spalding.

The Department of Zoology offers a program leading to a B.S. with a major in Zoology. A core of required courses and restricted electives in zoology, as well as supporting courses in other fields, provides an introduction to, and an appreciation of, the broad field of zoology. Through selection of additional elective courses to complete

*Adjunct members of the faculty

to required 30 credit hours in zoology, the student may explore in greater depth some phase of zoology which is of particular interest to him.

All majors are required to complete a minimum of 30 hours in zoology with an average grade of "C". Required courses include ZOOL 101, 102, 246, and one course from each of Groups I, II, and III listed below. Additional courses to complete the required 30 hours in zoology may be selected from any of the undergraduate courses in zoology except ZOOL 146—Heredity and Man (3), ZOOL 201, 202—Human Anatomy and Physiology (4, 4) and ZOOL 207S—Development of Human Body (2), which are not acceptable for credit toward the major. At least 12 hours of courses taken for completion of the major must be at advanced level (300 or 400). Required supporting courses are listed in "D" below.

A. Required Courses in Zoology
Zool. 101—General Zoology (4)
Zool. 102—The Animal Phyla (4)
Zool. 246—Genetics (4)

B. Restricted Electives in Zoology
One course must be selected from each of the following groups. At least two of the three courses taken in fulfillment of the group requirements must be laboratory courses.

GROUP I

Zool. 411—Cell Biology (4)
Zool. 413—Biophysics (3)
Zool. 421—Vertebrate Physiology (4)
Zool. 422—Vertebrate Physiology (4)
Zool. 426—General Endocrinology (3)

GROUP II

Zool. 430—Vertebrate Embryology (4)
Zool. 472—General Protozoology (4)
Zool. 475—General Parasitology (4)
Zool. 481—Invertebrate Zoology (4)
Zool. 482—Marine Vertebrate Zoology (4)
Zool. 483—Vertebrate Zoology (4)

GROUP III

Zool. 440—Evolution (3)
Zool. 446—Molecular Genetics (3)
Zool. 456—Zoogeography (3)
Zool. 460—Ethology (3)
Zool. 461—Ethology Laboratory (3)
Zool. 470—Animal Ecology (3) or:
Zool. 470—Advanced Ecology (2) and
Zool. 471—Lab. and Field Ecology (2)
Zool. 480—Hydrobiology (4)

C. Total Requirements for Zoology Courses

The major must earn a total of 30 hours in Zoology including the required courses and restricted electives listed above. The additional required hours may be selected from additional courses in Groups I, II, and III, or from other courses in Zoology including:

Zool. 205—History of Zoology (1)
Zool. 206—Zoological Literature (1)
Zool. 209—Basic Study in Zoology (1-4)
Zool. 319—Special Problems in Zoology (1-2)
Zool. 328—Selected Topics in Zoology (1-4)

Students participating in the Departmental Honors Program may take the following courses in fulfillment of the course requirements in Zoology:
Zool. 308H—Honors Seminar (1)
Zool. 309H—Honors Independent Study (1-4)
Zool. 318H—Honors Research (1-2)

D. Required Supporting Courses:

1. Chem. 103, 104—College Chemistry I and II (4, 4)
2. Chem. 201, 202—College Chemistry III and Laboratory (3, 2)
3. Mathematics through one year of Calculus (completion of Math. 220, 221—Elementary Calculus (3, 3) or Math. 140, 141—Analysis I, II (4, 4)
4. Phys. 121, 122—Fundamentals of Physics (4, 4) or Phys. 141, 142—Principles of Physics (4, 4)
5. One of the following courses:
   Agri. 401—Agricultural Biometrics (3)
   Chem. 203, 204—College Chemistry IV (3) and College Chemistry Laboratory IV (2)
   Chem. 219—Elements of Quantitative Analysis (4)
   Math. 240—Linear Algebra (4)
   Psych. 200—Statistical Methods in Psychology (3)
   Socy. 201—Introductory Statistics for Sociology (3)
   Stat. 400—Applied Probability and Statistics I (3)
   Stat. 464—Introduction to Biostatistics (3)

It is strongly recommended that the supporting courses in chemistry and mathematics be completed as early in the curriculum as possible. Students desiring to enter graduate study in certain areas of zoology are advised to take biochemistry, physical chemistry, statistics or advanced mathematics as a part of their undergraduate training.

HONORS

The Department of Zoology also offers a special program for the exceptionally talented and promising student. The Honors Program emphasizes the scholarly approach to independent study rather than adherence to a rigidly prescribed curriculum. Information regarding this program may be obtained from the departmental office or from the chairman of the zoology Honors Program.

IV
COURSES

IN ALPHABETICAL ORDER BY COURSE NUMBER

Courses numbered from 000 to 099 are non-credit courses and include such subjects as required physical education and review of high school math. The figure given in parentheses after the title is for the purpose of billing.

Courses numbered from 100 to 199 are primarily freshmen courses and are open to undergraduate students who meet the stated prerequisite and curricular requirements.

Courses numbered from 200-299 are primarily sophomore courses and are open to undergraduate students who meet the stated prerequisite and curricular requirements.

Courses numbered from 300-399 are junior and senior courses not acceptable for credit toward graduate degrees. Under some conditions, second semester sophomores may register for 300 level courses with the dean's approval.

Courses numbered from 400-499 are junior and senior courses acceptable for credit toward some graduate degrees.

Courses numbered from 500-599 are professional school courses and post-baccalaureate courses.

Courses numbered from 600-899 are restricted to graduate students.

Course numbers ending with an 8 or 9 indicate the course may be repeated for credit.

AFRO-AMERICAN STUDIES

AASP 100. INTRODUCTION TO AFRO-AMERICAN STUDIES. (3)
A survey of significant aspects of black life and thought which are reflected in black literature, music and art. This interdisciplinary course examines the African cultural and historical backgrounds and traces the development of black culture in Africa, the United States and the Caribbean from the fifteenth century to contemporary times. Emphasis is placed upon the social, political and economic changes in black life that have influenced the ideas of black artists and spokesmen.

AASP 101. ELEMENTARY SWAHILI. (3)
An introductory course in the Swahili language. Study of linguistic structure and development of audio-lingual ability. Three recitations and one laboratory hour per week.

AASP 102. INTERMEDIATE SWAHILI. (3)
Three recitations and one laboratory hour per week. Further study of linguistic structure and development of audio-lingual and writing ability, and introduction to the reading of literary texts.

AASP 112. ADVANCED SWAHILI. (3)
For students who wish to develop fluency and confidence in the speaking, reading and writing of Swahili language. Discussions in Swahili.

AASP 302. BLACK CULTURE IN THE UNITED STATES. (3)
Examines important aspects of American negro life and thought which are reflected in Afro-American literature, drama, music, and art. Beginning with the cultural heritage of slavery. Surveys the changing modes of black creative expresssion from the nineteenth century to the present.

AASP 311. THE AFRICAN SLAVE TRADE. (3)
The relationship of the slave trade of Africans to the development of British capitalism and its industrial revolution; and to the economic and social development of the Americas.

AASP 312. SOCIAL AND CULTURAL EFFECTS OF COLONIZATION AND RACISM. (3)
A comparative approach to the study of the social and cultural effects of colonization and racism on black people in Africa, Latin America and in the United States—community and family life, religion, economic institutions, education and artistic expression.

AASP 400. DIRECTED READINGS IN AFRO-AMERICAN STUDIES. (3)
The readings will be directed by the director of Afro-American studies. The topics will be chosen by the director to meet the needs and interests of individual students.

AASP 401. SEMINAR IN AFRO-AMERICAN STUDIES. (3)
The theory and concepts of the social and behavioral sciences as they relate to Afro-American studies. Required for the certificate in Afro-American studies. Prerequisites: At least 15 hours of Afro-American studies or related courses or permission of the director.

AASP 411. NINETEENTH CENTURY BLACK RESISTANCE MOVEMENTS. (3)
A comparative description of the black resisitance movements in Africa and America during the nineteenth century; analysis of their relationship, similarities and dissimilarities as well as their impact on twentieth century black nationalism.

AASP 428. SPECIAL TOPICS IN BLACK DEVELOPMENT. (3)
A multi-disciplinary and inter-disciplinary educational experience concerned with questions relevant to the development of black people everywhere. Development implies political, economic, social, and culture change among other things. Consequently, a number of topics may be examined and studied.

AASP 429. SPECIAL TOPICS IN BLACK CULTURE. (3)
An interdisciplinary approach to the role of black artists around the world. Emphasis is placed upon contributions of the black man in Africa, the Caribbean and the United States to the literary arts, the performing arts, and the visual arts. Course content will be established in terms of those ideas and concepts which reflect the cultural climate of the area in which they were produced. Attention to individual compositions and works of art through lectures, concepts, field trips, and audio-visual devices.

AGRICULTURAL ENGINEERING

AGEN 100. BASIC AGRICULTURAL ENGINEERING TECHNOLOGY. (3)
An introduction to the application of engineering concepts. Topics include quantitation and measurement; mechanical, thermal, fluid, and electrical principles and their relationship to biological systems and materials of agricultural and aquacultural products. (For non-engineering majors.)

AGEN 200. INTRODUCTION TO FARM MECHANICS. (2)
One lecture and one laboratory period a week. A study of the hand tools and power equipment and their safe use as it applies to mechanized farms. Principles and practice in arc and gas welding, cold metal and sheet metal work are provided. Also, tool fitting, woodworking, plumbing, blueprint reading and use of concrete.

AGEN 305. FARM MECHANICS. (2)
Two laboratory periods a week. Available only to seniors in agricultural education. This course consists of laboratory exercises in practical farm shop and farm equipment maintenance, repair, and construction projects, and a study of the principles of shop organization and administration.

AGEN 313. MECHANICS OF FOOD PROCESSING. (4)
Three lectures and one laboratory. Prerequisite: PHYS 111 or 121. Applications in the processing and preservation of foods of power transmission, hydraulics, electricity, thermodynamics, refrigeration, instruments and controls, materials handling and time and motion analysis.

AGEN 324. ENGINEERING DYNAMICS OF BIOLOGICAL MATERIALS. (3)
Three lectures per week. Prerequisite: ENME 340. Investigates the physical parameters (impact, temperature, humidity, light, etc.) governing the response of biological materials. Analysis of unit operations and their effect on the physical and quality characteristics of agricultural products.

AGEN 343. FUNCTIONAL DESIGN OF MACHINERY AND EQUIPMENT. (3)
Two lectures and one two hour laboratory per week. Prerequisite: ENES 221. Theory and methods of agricultural machine design. Application of machine design principles and physical properties of soils and agricultural products in design of machines to perform specific tasks.

AGEN 401. AGRICULTURAL PRODUCTION EQUIPMENT. (3)
Two lectures and one laboratory per week. Prerequisite: AGEN 100. Principles of operation and functions of power and machinery units as related to tillage; cutting, conveying and separating units; and control mechanisms. Principles of internal combustion engines and power unit components.

AGEN 402. AGRICULTURAL MATERIALS HANDLING AND ENVIRONMENTAL CONTROL. (3)
Two lectures and one laboratory per week. Prerequisite: AGEN 100. Characteristics of construction materials and details of agricultural structures. Fundamentals of electricity, electrical circuits, and electrical controls. Materials handling and environmental requirements of farm products and animals.

AGEN 421. POWER SYSTEMS. (3)
Two lectures and one two hour laboratory per week. Prerequisites: ENME 216, ENEE 300 and ENME 340. Analysis of energy conversion devices including internal combustion engines, electrical and hydraulic motors. Fundamentals of power transmission and coordination of power sources with methods of power transmission.

AGEN 422. SOIL AND WATER ENGINEERING. (3)
Three lectures per week. Prerequisite: ENME 340. Applications of engineering and soil sciences in erosion control, drainage, irrigation and watershed management. Principles of agricultural hydrology and design of water control and conveyance systems.

AGEN 424. FUNCTIONAL AND ENVIRONMENTAL DESIGN OF AGRICULTURAL STRUCTURES. (3)
Two lectures and one two hour laboratory per week. Prerequisite: AGEN 324 or ENME 340. An analytical approach to the design and planning of functional and environmental requirements of plants and animals in semi or completely enclosed structures.

AGEN 432. GENERAL HYDROLOGY. (3)
Three lectures per week. Qualitative aspects of basic hydrologic principles pertaining to the properties, distribution and circulation of water as related to public interest in water resources.

AGEN 433. ENGINEERING HYDROLOGY. (3)
Three lectures per week. Prerequisites: MATH 246, ENCE 330 or ENME 340. Properties, distribution and circulation of water from the sea and in the atmosphere emphasizing movement overland, in channels and

through the soil profile. Qualitative and quantitative factors are considered.

AGEN 435. AQUACULTURAL ENGINEERING. (3)
Prerequisite: Consent of department. A study of the engineering aspects of development, utilization and conservation of aquatic systems. Emphasis will be on harvesting and processing acquatic animals or plants as related to other facets of water resources management.

AGEN 489. SPECIAL PROBLEMS IN AGRICULTURAL ENGINEERING. (1-3)
Prerequisite: Approval of department. Student will select an engineering problem and prepare a technical report. The problem may include design, experimentation, and/or data analysis.

AGEN 499. SPECIAL PROBLEMS IN FARM MECHANICS. (1-3)
Prerequisite: Approval of department. Not acceptable for majors in agricultural engineering. Problems assigned in proportion to credit.

AGRICULTURE

AGRI 101. INTRODUCTION TO AGRICULTURE. (1)
Required of all beginning freshmen and sophomores in agriculture. Other students must get the consent of the instructor. A series of lectures, introducing the student to the broad field of agriculture.

AGRI 301. INTRODUCTION TO AGRICULTURAL BIOMETRICS. (3)
Two lectures and one laboratory period per week. Prerequisite: University math requirement. Descriptive statistics, sampling, confidence interval estimation, introduction to hypothesis testing, simple regression and correlation. Course emphasis shall be in application of simple statistical techniques and on interpretation of the statistical results.

AGRI 401. AGRICULTURAL BIOMETRICS. (3)
Two lectures and one laboratory period per week. Prerequisite: MATH 115 or equivalent. Probability, measures of central tendency and dispersion, frequency distributions, tests of statistical hypotheses, regression analyses, multiway analysis with emphasis on the use of statistical methods in agricultural research.

AGRI 489. SPECIAL TOPICS IN AGRICULTURE. (1-3)
Credit according to time scheduled and organization of the course. A lecture series organized to study in depth a selected phase of agriculture not normally associated with one of the existing programs.

AGRONOMY

AGRO 100. CROP PRODUCTION LABORATORY. (2)
Two laboratory periods a week. Demonstration and application of practices in the identification, distribution and management of field crops.

AGRO 102. CROP PRODUCTION. (2)
Prerequisite: AGRO 100 or concurrent enrollment therein. Culture, use, improvement, adaptation, distribution, and history of field crops.

AGRO 103. WORLD CROPS AND FOOD SUPPLY. (3)
An introduction to the relationship of crops with civilization. The past, present, and future interactions of the biology of crop plants and world affairs and population will be studied. The future impact of crops on world affairs will be emphasized.

AGRO 105. SOIL AND THE ENVIRONMENT. (3)
A study of soils as an irreplaceable natural resource. Importance of soils in the ecosystem, and analysis of land resource areas in the U.S. Discussion of soils as a pollutant and the pollution of soils by various agents and the role of soil as a medium for storage, decontamination or inactivation of pollutants.

AGRO 202. GENERAL SOILS. (4)
Three lectures and one laboratory period a week. Prerequisite: CHEM 103 or permission of instructor. A study of the fundamentals of soils including their origin, development, relation to natural sciences, effect on civilization, physical properties, and chemical properties.

AGRO 398. SENIOR SEMINAR. (1)
Reports by seniors on current scientific and practical publications pertaining to agronomy.

AGRO 403. CROP BREEDING. (3)
Prerequisite: BOTN 414 or ZOOL 246. Principles and methods of breeding annual self and cross-pollinated plant and perennial forage species.

AGRO 404. TOBACCO PRODUCTION. (3)
Prerequisite: BOTN 100. A study of the history, adaptation, distribution, culture, and improvement of various types of tobacco, with special emphasis on problems in Maryland tobacco production. Physical and chemical factors associated with yield and quality of tobacco will be stressed.

AGRO 405. TURF MANAGEMENT. (3)
Two lectures and one laboratory period per week. Prerequisite: BOTN 100. A study of principles and practices of managing turf for lawns, golf courses, athletic fields, playgrounds, airfields and highways for commercial sod production.

AGRO 406. FORAGE CROP PRODUCTION. (2)
Prerequisite: BOTN 100, AGRO 100 or concurrent enrollment therein. Study of the production and management of grasses and legumes for quality hay, silage, and pasture.

AGRO 407. CEREAL CROP PRODUCTION. (2)
Prerequisite: BOTN 100, AGRO 100 or concurrent enrollment therein. Study of the principles and practices of corn, wheat, oats, barley, rye, and soybean production.

AGRO 411. SOIL FERTILITY PRINCIPLES. (3)
Prerequisite: AGRO 202. A study of the chemical, physical, and biological characteristics of soils that are important in growing crops. Soil deficiencies of physical, chemical, or biological nature and their correction by the use of lime, fertilizers, and rotations are discussed and illustrated.

AGRO 412. COMMERCIAL FERTILIZERS. (3)
Prerequisites: AGRO 202 or permission of instructor. A study of the manufacturing of commercial fertilizers and their use in soils for efficient crop production.

AGRO 413. SOIL AND WATER CONSERVATION. (3)
Two lectures and one laboratory period a week. Prerequisite: AGRO 202 or permission of instructor. A study of the importance and causes of soil erosion, methods of soil erosion control, and the effect of conservation practices on soil-moisture supply. Special emphasis is placed on farm planning for soil and water conservation. The laboratory period will be largely devoted to field trips.

AGRO 414. SOIL CLASSIFICATION AND GEOGRAPHY. (4)
Three lectures and one laboratory period a week. Prerequisite: AGRO 202 or permission of instructor. A study of the genesis, morphology, classification and geographic distribution of soils. The broad principles governing soil formation are explained. Attention is given to the influence of geographic factors on the development and use of the soils in the United States and other parts of the world. The laboratory periods will be largely devoted to the field trips and a study of soil maps of various countries.

AGRO 415. SOIL SURVEY AND LAND USE. (3)
Two lectures and one laboratory period a week. An introduction to soil survey interpretation as a tool in land use both in agricultural and urban situations. The implications of soil problems as delineated by soil surveys on land use will be considered.

AGRO 417. SOIL PHYSICS. (3)
Two lectures and one laboratory period a week. Prerequisite: AGRO 202 and a course in physics, or permission of instructor. A study of physical properties of soils with special emphasis on relationship to soil productivity.

AGRO 421. SOIL CHEMISTRY. (3)
One lecture and two laboratory periods a week. Prerequisite: AGRO 202 or permission of instructor. A study of the chemical composition of soils; cation and anion exchange; acid, alkaline and saline soil conditions; and soil fixation of plant nutrients. Chemical methods of soil analysis will be studied with emphasis on their relation to fertilizer requirements.

AGRO 422. SOIL BIOCHEMISTRY. (3)
Two lectures and one laboratory period a week. Prerequisites: AGRO 202, CHEM 104 or consent of instructor. A study of biochemical processes involved in the formation and decomposition of organic soil constituents. Significance of soil-biochemical processes involved in plant nutrition will be considered.

AGRO 423. SOIL-WATER POLLUTION. (3)
Prerequisite: Background in biology and CHEM 104. Reaction and fateof pesticides, agricultural fertilizers, industrial and animal wastes in soil and water will be discussed. Their relation to the environment will be emphasized.

AGRO 451. CROPPING SYSTEMS. (2)
Prerequisite: AGRO 102 or equivalent. The coordination of information from various courses in the development of balanced cropping systems, appropriate to different objectives in various areas of the state and nation.

AGRO 452. SEED PRODUCTION AND DISTRIBUTION. (2)
One lecture and one laboratory period a week. Prerequisite: AGRO 102 or equivalent. A study of seed production, processing, and distribution; federal and state seed control programs; seed laboratory analysis; release of new varieties; and maintenance of foundation seed stocks.

AGRO 453. WEED CONTROL. (3)
Two lectures and one laboratory period a week. Prerequisite: AGRO 102 or equivalent. A study of the use of cultural practices and chemical herbicides in the control of weeds.

AGRO 499. SPECIAL PROBLEMS IN AGRONOMY. (1-3)
Prerequisites: AGRO 202, 406, 407 or permission of instructor. A detailed study, including a written report of an important problem in agronomy.

AMERICAN STUDIES

AMST 426. CULTURE AND THE ARTS IN AMERICA. (3)
Prerequisite: Junior standing. A study of American Institutions, the intellectual and esthetic climate from the Colonial period to the present.

AMST 427. CULTURE AND THE ARTS IN AMERICA. (3)
Prerequisite: Junior standing. A study of American institutions, the intellectual and esthetic climate from the colonial period to the present.

AMST 436. READINGS IN AMERICAN STUDIES. (3)
Prerequisite: Junior standing. An historical survey of American values as presented in various key writings.

AMST 437. READINGS IN AMERICAN STUDIES. (3)
Prerequisite: Junior standing. An historical survey of American values as presented in various key writings.

AMST 446. POPULAR CULTURE IN AMERICA. (3)
Prerequisite: Junior standing and permission of instructor. A survey of the historical development of the popular arts and modes of popular entertainment in America.

AMST 447. POPULAR CULTURE IN AMERICA. (3)
Prerequisite: Junior standing and AMST 446. Intensive research in the sources and themes of contemporary American popular culture.

ANIMAL SCIENCES

ANSC 101. PRINCIPLES OF ANIMAL SCIENCE. (3)
Two lectures and one, two-hour laboratory period per week. A comprehensive course, including the development of animal science, its contributions to the economy, characteristics of animal products, factors of efficient and economical production and distribution.

ANSC 201. BASIC PRINCIPLES OF ANIMAL GENETICS. (3)
Two lectures and one laboratory period per week. The basic principles and laws of Mendelian genetics as applied to economically important domestic animals. Included will be gene action and interaction, linkage and crossing over, recombination, cytological maps, chromosomal aberrations, mutations, structure of the genetic material and regulation of genetic information.

ANSC 203. FEEDS AND FEEDING. (3)
Credit not allowed for ANSC major. Two lectures and one laboratory period per week. Prerequisites: CHEM 103, 104. Elements of nutrition, source, characteristics and adaptability of the various feedstuffs to the several classes of livestock. A study of the composition of feeds, the nutrient requirements of farm animals and the formulation of economic diets and rations for livestock.

ANSC 211. ANATOMY OF DOMESTIC ANIMALS. (4)
Three lectures and one laboratory per week. Prerequisite: ZOOL 101. A systematic gross and microscopic comparative study of the anatomy of the major domestic animals. Special emphasis is placed on those systems important in animal production.

ANSC 212. APPLIED ANIMAL PHYSIOLOGY. (4)
Three lectures and one three hour laboratory period per week. Prerequisite: ANSC 211 or equivalent. The physiology of domesticated animals with emphasis on functions related to production, and the physiological adaption to environmental influences.

ANSC 221. FUNDAMENTALS OF ANIMAL PRODUCTION. (3)
Two lectures and one laboratory period per week. This course deals with the adaption of beef cattle, sheep, swine and horses to significant and specific uses. Breeding, feeding, management practices and criteria for evaluating usefulness are emphasized.

ANSC 222. LIVESTOCK EVALUATION. (3)
Two lectures and one laboratory period per week. Prerequisite: ANSC 221 or permission of instructor. A study of type and breed characteristics of beef cattle, sheep and swine and the market classes of livestock which best meet present day demands. One field trip of about two days duration is made during which students participate in the Annual Eastern Intercollegiate Livestock Clinic.

ANSC 223. SEMINAR. (1)
One lecture per week. Reviews, reports and discussions of pertinent subjects in animal science.

ANSC 226. MAN, CULTURE, ANIMALS. (2)
A general study of the importance of animals in the cultural development of man. Historical and contemporary uses of particular animal species will be explored. Environmental limitations to human development which have been overcome by man-animal relationships will be emphasized.

ANSC 230. INTRODUCTION TO HORSE MANAGEMENT. (3)
Two lectures and one two-hour laboratory period per week. A general course in horse management for students who intend to work in activities closely related to the horse industry. The basis for the usefulness of horses to individuals and society will be developed by application of the principles of nutrition, physiology, anatomy, genetics, behavior, and environmental control.

ANSC 242. DAIRY PRODUCTION. (3)
Two lectures and one laboratory period per week. Prerequisite: ANSC 101. A comprehensive course in dairy

breeds, selection of dairy cattle, dairy cattle nutrients, feeding and management.

ANSC 244. DAIRY CATTLE TYPE APPRAISAL. (1)
Freshmen, by permission of instructor. Two laboratory periods. Analysis of dairy cattle type with emphasis on the comparative judging of dairy cattle.

ANSC 252. INTRODUCTION TO THE DISEASES OF WILDLIFE. (2)
Two lectures per week. Prerequisite: ZOOL 101. The principal diseases of North American Wildlife will be briefly considered. For each disease, specific attention will be given to the following: signs evidenced by the affected animal or bird, causative agent, means of transmission and effects of the disease on the population of the species involved. Also included where appropriate is a consideration of the threat that each disease may pose to man or his domestic animals.

ANSC 261. ADVANCED POULTRY JUDGING. (1)
Prerequisite: ANSC 101. One lecture or laboratory period per week. The theory and practice of judging and culling by physical means is emphasized, including correlation studies of characteristics associated with productivity. Contestants for regional collegiate judging competitions will be selected from this class.

ANSC 262. COMMERCIAL POULTRY MANAGEMENT. (3)
Prerequisite: ANSC 101. A symposium of finance, investment, plant layout, specialization, purchase of supplies and management problems in baby chick, egg, broiler and turkey production; foremanship, advertising, selling, by-products, production and financial records. Field trips required.

ANSC 301. ADVANCED LIVESTOCK EVALUATION. (2)
Two laboratory periods per week. Prerequisites: ANSC 222 and permission of instructor. An advanced course in meat animal evaluation designed to study the relationship and limitations that exist in evaluating breeding and market animals and the relationship between the live market animal and its carcass. Evaluating meat carcasses, wholesale meat cuts and meat grading will be emphasized. The most adept students enrolled in this course are chosen to represent the University of Maryland in intercollegiate judging contests.

ANSC 398. SEMINAR. (1)
Prerequisite: Approval of the staff. Presentation and discussion of current literature and research work in animal science, or in fish and wildlife management. Repeatable to a maximum of two hours.

ANSC 399. SPECIAL PROBLEMS IN ANIMAL SCIENCE. (1-2)
Prerequisite: Approval of staff. Work assigned in proportion to amount of credit. A course designed for advanced undergraduates in which specific problems relating to animal science will be assigned.

Three lectures per week. Prerequisite: CHEM 104; ANSC 212 recommended. A study of the fundamental role of all nutrients in the body, including their digestion, absorption, and metabolism. Dietary requirements and nutritional deficiency syndromes of laboratory and farm animals and man will be considered.

ANSC 402. APPLIED ANIMAL NUTRITION. (3)
Two lectures and one laboratory period per week. Prerequisites: MATH 110, ANSC 401 or permission of instructor. A critical study of those factors which influence the nutritional requirements of ruminants, swine and poultry. Practical feeding methods and procedures used in formulation of economically efficient rations will be presented.

ANSC 406. ANIMAL ADAPTATIONS TO THE ENVIRONMENT. (3)
Three lectures per week. Prerequisites: Anatomy and physiology or concurrent registration in physiology. The specific anatomical and physiological modifications employed by animals adapted to certain stressful environments will be considered. Particular emphasis will be placed on the problems of temperature regulation and water balance. Specific areas for consideration will include: animals in cold (including hibernation), animals in dry heat, diving animals and animals in high altitudes.

ANSC 407. ADVANCED DAIRY PRODUCTION. (1)
An advanced course primarily designed for teachers of vocational agriculture and county agents. It includes a study of the newer discoveries in dairy cattle nutrition, breeding and management.

ANSC 411. BIOLOGY AND MANAGEMENT OF SHELLFISH. (4)
Two lectures and two three-hour laboratory periods each week. Field trips. Identification, biology, management, and culture of commercially-important molluscs and crustacea. Prerequisite: One year of biology or Zoology. This course will examine the shellfisheries of the world, but will emphasize those of the northwestern Atlantic Ocean and Chesapeake Bay.

ANSC 412. INTRODUCTION TO DISEASES OF ANIMALS. (3)
Prerequisite: MICB 200 and ZOOL 101. Two lectures and one laboratory period per week. This course gives basic instruction in the nature of disease: including causation, immunity, methods of diagnosis, economic importance, public health aspects and prevention and control of the common diseases of sheep, cattle, swine, horses and poultry.

ANSC 413. LABORATORY ANIMAL MANAGEMENT. (3)
A comprehensive course in care and management of laboratory animals. Emphasis will be placed on physiology, anatomy and special uses for the different species. Disease prevention and regulations for maintaining animal colonies will be covered. Field trips will be required.

ANSC 414. BIOLOGY AND MANAGEMENT OF FISH. (4)
Prerequisite: One year of biology or zoology. Two lectures and two three-hour laboratories a week. Fundamentals of individual and population dynamics; theory and practice of sampling fish populations; management schemes.

ANSC 416. WILDLIFE MANAGEMENT. (3)
Two lectures and one laboratory. An introduction to the interrelationships of game birds and mammals with their environment, population dynamics and the principles of wildlife management.

ANSC 422. MEATS. (3)
Two lectures and one laboratory period per week. Prerequisite: ANSC 221. A course designed to give the basic facts about meat as a food and the factors influencing acceptability, marketing, and quality of fresh meats. It includes comparisons of characteristics of live animals with their carcasses, grading and evaluating carcasses as well as wholesale cuts, and the distribution and merchandising of the nation's meat supply. Laboratory periods are conducted in packing houses, meat distribution centers, retail outlets and university meats laboratory.

ANSC 423. LIVESTOCK MANAGEMENT. (3)
One lecture and two laboratory periods per week. Prerequisite: ANSC 401. Application of various phases of animal science to the management and production of beef cattle, sheep and swine.

ANSC 424. LIVESTOCK MANAGEMENT. (3)
One lecture and two laboratory periods per week. Prerequisite: ANSC 423. Applications of various phases of animal science to the management and production of beef cattle, sheep and swine.

ANSC 426. PRINCIPLES OF BREEDING. (3)
Prerequisites: ANSC 201, or equivalent, ANSC 222, ANSC 423 or 424. Graduate credit (1-3 hours) allowed with permission of instructor. The practical aspects of animal breeding, heredity, variation, selection, develop-

ment, systems of breeding and pedigree study are considered.

ANSC 442. DAIRY CATTLE BREEDING. (3)
Two lectures and one laboratory period per week. Prerequisites: ANSC 242, ANSC 201. A specialized course in breeding dairy cattle. Emphasis is placed on methods of evaluation and selection, systems of breeding and breeding programs.

ANSC 444. ANALYSIS OF DAIRY PRODUCTION SYSTEMS. (3)
Prerequisites: AGEC 406 and ANSC 203 or 214, or permission of instructor. The business aspects of dairy farming including an evaluation of the costs and returns associated with each segment. The economic impact of pertinent management decisions is studied. Recent developments in animal nutrition, and genetics, agricultural economics, agricultural engineering, and agronomic practices are discussed as they apply to management of a dairy herd. (Alternating springs, 1974-76)

ANSC 446. PHYSIOLOGY OF MAMMALIAN REPRODUCTION. (3)
Two lectures and one three-hour laboratory period per week. Prerequisite: ZOOL 422 or ANSC 212. Anatomy and physiology or reproductive processes in wild and domesticated mammals.

ANSC 452. AVIAN PHYSIOLOGY. (2)
One three-hour laboratory period per week. Prerequisites: A basic course in animal physiology. The basic physiology of the bird is discussed, excluding the reproductive system. Special emphasis is given to physiological differences between birds and other vertebrates.

ANSC 462. PHYSIOLOGY OF HATCHABILITY. (1)
One three-hour laboratory period per week. Prerequisite: ZOOL 421 or 422. The physiology of embryonic development as related to principles of hatchability and problems of incubation encountered in the hatchery industry are discussed.

ANSC 464. POULTRY HYGIENE. (3)
Two lectures and one laboratory period per week. Prerequisites: MICB 200 and ANSC 101. Virus, bacterial and protozoon diseases, parasitic diseases, prevention, control and eradication.

ANSC 466. AVIAN ANATOMY. (3)
Two lectures and one laboratory per week. Prerequisite: ZOOL 102. Gross and microscopic structure, dissection and demonstration.

ANSC 467. POULTRY BREEDING AND FEEDING. (1)
This course is designed primarily for teachers of vocational agriculture and extension service workers. The first half will be devoted to problems concerning breeding and the development of breeding stock. The second half will be devoted to nutrition.

ANSC 477. POULTRY PRODUCTS AND MARKETING. (1)
This course is designed primarily for teachers of vocational agriculture and county agents. It deals with the factors affecting the quality of poultry products and with hatchery management problems, egg and poultry grading, preservation problems and market outlets for Maryland poultry.

ANSC 480. SPECIAL TOPICS IN FISH AND WILDLIFE MANAGEMENT. (3)
Three lectures. Analysis of various state and federal programs related to fish and wildlife management. This would include: fish stocking programs, Maryland deer management program, warm water fish management, acid drainage problems, water quality, water fowl management, wild turkey management and regulations relative to the administration of these programs.

ANSC 487. SPECIAL TOPICS IN ANIMAL SCIENCE. (1)
Prerequisite, permission of instructor. This course is designed primarily for teachers of vocational agriculture and Extension Service personnel. One primary topic to be selected mutually by the instructor and students will be presented each session.

ANTHROPOLOGY

ANTH 101. INTRODUCTION TO ANTHROPOLOGY—ARCHAEOLOGY AND PHYSICAL ANTHROPOLOGY. (3)
May be taken for credit in the General Education Program. General patterns of the development of human culture; the biological and morphological aspects of man viewed in his cultural setting.

ANTH 102. INTRODUCTION TO ANTHROPOLOGY—CULTURAL ANTHROPOLOGY AND LINGUISTICS. (3)
Social and cultural principles as exemplified in ethnographic descriptions. The study of language within the context of anthropology.

ANTH 221. MAN AND ENVIRONMENT. (3)
A geographical introduction to ethnology, emphasizing the relations between cultural forms and natural environment.

ANTH 241. INTRODUCTION TO ARCHAEOLOGY. (3)
A survey of the basic aims and methods of archaeological field work and interpretation, with emphasis on the reconstruction of prehistoric ways of life.

ANTH 261. INTRODUCTION TO PHYSICAL ANTHROPOLOGY. (3)
The biological evolution of man, including the process of race formation, as revealed by the study of the fossil record and observation of modern forms.

ANTH 271. LANGUAGE AND CULTURE. (3)
A non-technical introduction to linguistics, with special consideration of the relations between language and other aspects of culture. (Listed also as LING 101).

ANTH 371. INTRODUCTION TO LINGUISTICS. (3)
Introduction to the basic concepts of modern descriptive linguistics. Phonology, morphology, syntax. Examinations of the methods of comparative linguistics, internal reconstruction, dialect geography. Listed also as ENGL 280 and LING 100.

ANTH 389. RESEARCH PROBLEMS. (1-6)
Prerequisite: Permission of instructor. Introductory training in anthropological research methods. The student will prepare a paper embodying the results of an appropriate combination of research techniques applied to a selected problem in any field of anthropology.

ANTH 397. ANTHROPOLOGICAL THEORY. (3)
Prerequisite: Permission of instructor. A survey of the historical development and current emphasis in the theoretical approaches of all fields of anthropology, providing an integrated frame of reference for the discipline as a whole.

ANTH 401. CULTURAL ANTHROPOLOGY—PRINCIPLES AND PROCESSES. (3)
Prerequisite: ANTH 101, 102, or 221. An examination of the nature of human culture and its processes, both historical and functional. The approach will be topical and theoretical rather than descriptive.

ANTH 402. CULTURAL ANTHROPOLOGY—WORLD ETHNOGRAPHY. (3)
Prerequisite: ANTH 101, 102, or 221. A descriptive survey of the culture areas of the world through an examination of the ways of selected representative societies.

ANTH 412. PEOPLES AND CULTURES OF OCEANIA. (3)
A survey of the cultures of Polynesia, Micronesia, Melanesia and Australia. Theoretical and cultural-historical problems will be emphasized.

ANTH 414. ETHNOLOGY OF AFRICA. (3)
Prerequisites: ANTH 101 and 102. The native peoples and cultures of Africa and their historical relationships, with emphasis on that portion of the continent south of the Sahara.

ANTH 417. PEOPLES AND CULTURES OF THE FAR EAST. (3)
A survey of the major sociopolitical systems of China, Korea and Japan. Major anthropological questions will be dealt with in presenting this material.

ANTH 423. ETHNOLOGY OF THE SOUTHWEST. (3)
Prerequisites: ANTH 101 and 102. Culture history, economic and social institutions, religion, and mythology of the Indians of the southwest United States.

ANTH 424. ETHNOLOGY OF NORTH AMERICA. (3)
Prerequisites: ANTH 101 and 102. The native people and cultures of North America north of Mexico and their historical relationships, including the effects of contact with European-derived populations.

ANTH 426. ETHNOLOGY OF MIDDLE AMERICA. (3)
Prerequisites: ANTH 101 and 102. Cultural background and modern social, economic and religious life of Indian and mestizo groups in Mexico and Central America; processes of acculturation and currents in cultural development.

ANTH 431. SOCIAL ORGANIZATION OF PRIMITIVE PEOPLES. (3)
Prerequisites: ANTH 101 and 102. A comparative survey of the structures of non-literate and folk societies, covering both general principles and special regional developments.

ANTH 434. RELIGION OF PRIMITIVE PEOPLES. (3)
Prerequisites: ANTH 101 and 102. A survey of the religious systems of primitive and folk societies, with emphasis on the relation of religion to other aspects of culture.

ANTH 436. PRIMITIVE TECHNOLOGY AND ECONOMY. (3)
A survey of technology, food economy and general economic processes in non-industrial societies.

ANTH 437. POLITICS AND GOVERNMENT IN PRIMITIVE SOCIETY. (3)
A combined survey of politics in human societies and of important anthropological theories concerning this aspect of society.

ANTH 441. ARCHAEOLOGY OF THE OLD WORLD. (3)
Prerequisite: ANTH 101 or 241. A survey of the archaeological materials of Europe, Asia and Africa, with emphasis on chronological and regional interrelationships.

ANTH 451. ARCHAEOLOGY OF THE NEW WORLD. (3)
Prerequisite: ANTH 101 or 241. A survey of the archaeological materials of North and South America with emphasis on chronological and regional interrelationships.

ANTH 461. ADVANCED PHYSICAL ANTHROPOLOGY. (3)
Prerequisite: ANTH 101 or 261. A technical introduction to the hereditary, morphological, physiological, and behavioral characteristics of man and his primate ancestors and relatives, with emphasis on evolutionary processes.

ANTH 498. FIELD METHODS IN ETHNOLOGY. (1-6)
Field training in the collection and recording of ethnological data.

ANTH 499. FIELD METHODS IN ARCHAEOLOGY. (1-6)
Field training in the techniques of archaeological survey and excavation.

APPLIED DESIGN

APDS 101. FUNDAMENTALS OF DESIGN. (3)
Knowledge of basic art elements and principles gained through design problems which employ a variety of media.

APDS 102. DESIGN II. (3)
Prerequisite: APDS 101. Continued exploration of design as a means of visual expression with added emphasis on color and lighting.

APDS 103. DESIGN III—THREE-DIMENSIONAL DESIGN. (3)
Three studio periods. Prerequisites: APDS 101, 102. Creative efforts directed to discriminating use of form, volume, depth, and movement.

APDS 104. SURVEY OF ART HISTORY. (3)
A rapid survey of Western culture expressed through and influenced by the visual arts: monumental and residential architecture; furniture, textiles and costume; painting and sculpture.

APDS 210. PRESENTATION TECHNIQUES. (3)
Three studio periods. Prerequisites: APDS 101, 102 or equivalent. Comparative approach to basic presentation techniques used in the several areas of commercial design.

APDS 211. ACTION DRAWING—FASHION SKETCHING. (3)
Three studio periods. Prerequisites: APDS 101 and consent of instructor. Study of the balance and proportion of the human figure. Sketch techniques applied to action poses and fashion drawing in soft and lithograph pencils, pastels, water color, ink. Drawing from model.

APDS 212. DESIGN WORKSHOP FOR TRANSFERS. (5)
Prerequisite: APDS 101 or equivalent. Provides opportunity for transfer students to remove deficiences in lower-level design courses. Study of color, lighting and presentation techniques. May be taken no later than one semester after transfer into department.

APDS 220. INTRODUCTION TO FASHION DESIGN. (3)
Three studio periods. Prerequisite: APDS 101 or equivalent. Basic fashion figure drawing. Original designs rendered in transparent and opaque water color, soft pencil, pastels, and ink. Primarily for non-majors.

APDS 230. SILK SCREEN PRINTING. (3)
Three laboratory periods. Prerequisites: APDS 101, 102, or equivalent. Use of silk screen processes in execution original designs for commercial production.

APDS 237. PHOTOGRAPHY. (2)
One lecture, three hours laboratory. Prerequisites: APDS 101, 102, or equivalent. Study of fundamental camera techniques. Exploration of the expressive possibilities in relation to the field of design and visual communication.

APDS 320. FASHION ILLUSTRATION. (3)
First semester. Three studio periods. Prerequisites: APDS 101, 102, 103, 210, 211. Fabric and clothing structure as they relate to illustration. Opportunity to explore rendering styles and techniques appropriate to reproduction methods currently used in advertising. Guidance in development of individuality in presentations.

APDS 321. FASHION DESIGN AND ILLUSTRATION. (3)
Three studio periods. Prerequisite: APDS 320. Design and illustration of fashions appropriate to the custom market and to mass production.

APDS 322. ADVANCED COSTUME. (4)
Prerequisite: APDS 320, 321. Advanced problems in fashion illustration or design. Problems chosen with consent of instructor.

APDS 330. TYPOGRAPHY AND LETTERING. (3)
Three studio periods. Prerequisites: APDS 101, 102. Experience in hand lettering techniques as a means of understanding lettering styles in design composition. Recognition of type faces used in advertisement, book and magazine layout. Effect of printing processes on design choices.

APDS 331. ADVERTISING LAYOUT. (3)
Three studio periods. Prerequisites: APDS 330, EDIN 101A. Design of advertising layouts from initial idea to finished layout. Typography and illustration as they relate to reproduction processes used in direct advertising.

APDS 332. DISPLAY DESIGN. (3)
Three studio periods. Prerequisites: EDIN 101A, APDS 330 or equivalent. Application of design principles to creative display appropriate to exhibits, design shows, merchandising, Display construction.

APDS 337. ADVANCED PHOTOGRAPHY. (2)
Two studio periods. Prerequisite: APDS 237. Composition, techniques and lighting applicable to illustration, documentation, advertising design, and display.

APDS 380. PROFESSIONAL SEMINAR. (2)
Two lecture-discussion periods. Prerequisite: Junior standing and consent of instructor. Exploration of professional and career opportunities, ethics, practices, professional organizations. Portfolio evaluation.

APDS 430. ADVANCED PROBLEMS IN ADVERTISING DESIGN. (3)
Two studio periods. Prerequisite: APDS 331. Advanced problems in design and layout planned for developing competency in one or more areas of advertising design.

APDS 431. ADVANCED PROBLEMS IN ADVERTISING DESIGN. (3)
Two studio periods. Prerequisite: APDS 430. Advanced problems in design and layout planned for developing competency in one or more areas of advertising design.

APDS 437. ADVANCED PHOTOGRAPHY. (3)
Three laboratory periods. Continuation of APDS 337.

APDS 499. INDIVIDUAL PROBLEMS IN APPLIED DESIGN. (3-4)
A—ADVERTISING
B—COSTUME
Open only to advanced students who, with guidance can work independently. Written consent of instructor.

ARCHITECTURE

ARCH 170. INTRODUCTION TO THE BUILT ENVIRONMENT. (3)
Introduction of (1) conceptual, perceptual, behavioral and technical aspects of the environment; and (2) methods of analysis, problem solving and implementation. For students not majoring in architecture. Prerequisites: None. Lecture, seminar, 3 hours per week.

ARCH 200. BASIC ENVIRONMENTAL DESIGN. (4)
Introduction to the processes of visual and architectural design, including the study of visual design fundamentals. Field problems involving the student in the study of actual developmental problems. Lecture, studio, 9 hours per week.

ARCH 201. BASIC ENVIRONMENTAL DESIGN. (4)
Prerequisite: Architecture 200. Introduction to the processes of visual and architectural design, including the study of visual design fundamentals. Field problems involving the student in the study of actual developmental problems. Lecture, studio, 9 hours per week.

ARCH 214. MATERIALS AND METHODS OF CONSTRUCTION I. (2)
Two lectures per week. Architecture students only or permission of instructor. An introduction to the materials of construction, their properties, attributes and deficiencies.

ARCH 215. MATERIALS AND METHODS OF CONSTRUCTION II. (2)
Two lectures per week. Architecture students only or permission of instructor. Describes the methods by which the architect combines materials to produce structural systems.

ARCH 220. HISTORY OF ARCHITECTURE. (3)
Survey of architectural history. Lecture, 3 hours per week.

ARCH 221. HISTORY OF ARCHITECTURE. (3)
Prerequisite: ARCH 120. Continuation of survey of architectural history. Lecture, 3 hours per week.

ARCH 240. BASIC PHOTOGRAPHY. (2)
Provides a student with the basic concepts of clarity and organization on a two-dimensional surface and stresses photography as a tool for visual communication. Lecture one hour per week, three hours of laboratory per week.

ARCH 242. DRAWING I. (2)
Introduces the student to basic techniques of sketching and use of various media.

ARCH 300. ARCHITECTURE STUDIO I. (4)
Prerequisites: ARCH 200, 201. Develops a basic understanding of the elements of environmental control, basic structural systems, building processes, materials, and the ability to manipulate them. Lecture, studio, 9 hours per week. Corequisite: ARCH 132.

ARCH 301. ARCHITECTURE STUDIO II. (4)
Prerequisite: Architecture 300. Develops a basic understanding of the forms generated by different structural systems, environmental controls and methods of construction. Lecture, studio, 9 hours per week. Corequisite —ARCH 311.

ARCH 310. BUILDING SYSTEMS I. (4)
Prerequisites: MATH 221, Physics 122 and ARCH 201. Introduction to architectural science and technology treating principles of structures, environmental mechanical controls, and construction. Corequisite: Architecture 300. Lecture, studio, 6 hours per week.

ARCH 311. BUILDING SYSTEMS II. (4)
Prerequisite: Architecture 300 and 310. Develops working knowledge of the design principles and parameters of three areas of architectural science and technology: structures, environmental-mechanical controls, and construction. Lecture, studio, 6 hours per week. Corequisite, Architecture 301.

ARCH 322. STUDIES IN MEDIEVAL ARCHITECTURE. (3)
Limited to architecture students or by permission of the instructor. Architectural innovations from the Carolingian through the Gothic periods. Lecture, 3 hours per week.

ARCH 324. STUDIES IN RENAISSANCE ARCHITECTURE
Limited to architecture students or by permission of the instructor. Study of Renaissance architectural principles and their development in the Baroque period. Lecture, 3 hours per week.

ARCH 326. STUDIES IN MODERN ARCHITECTURE. (3)
Limited to architecture students or by permission of the instructor. Study of architectural problems from 1750 to the present. Lecture, 3 hours per week.

ARCH 340. ADVANCED PHOTOGRAPHY. (2)
Prerequisite: Architecture 240. Allows the student to investigate independently areas of photographic communication not covered in the basic course. Lecture, 1 hour per week; 3 hours lab.

ARCH 342. STUDIES IN VISUAL DESIGN. (3)
Studio work at an intermediate level in visual design divorced from architectural problem solving. Prerequisite: Arch 201. Lecture, studio work, 3 hours per week.

ARCH 350. THEORY OF URBAN FORM. (3)
Urban spatial forms of the past and present; theories of design of complexes of buildings, urban space and communities. Lecture, 3 hours per week.

ARCH 352. THE ARCHITECT IN THE COMMUNITY. (3)
The architect's role in the social and political dynamics of urban environmental design decision-making processes, including study of determination and expression of user needs, community aspirations, formal and informal program and design review processes. Seminar, 1 hour per week, field observation, approximately 3 hours per week.

ARCH 360. BASIC SITE ANALYSIS. (3)
Study of criteria and principles essential to the support of natural systems in physical site development. For architecture students or by permission of instructor. Lecture-lab, 3 hours per week.

ARCH 370. THEORIES AND LITERATURE OF ARCHITECTURE. (3)
Limited to architecture students or by permission of the instructor. Provides an understanding of some historical and present theories of architectural design readings and seminar discussions. Lecture, 3 hours per week.

ARCH 372. SIGNS, SYMBOLS AND MESSAGES IN ARCHITECTURE. (3)
Limited to Architecture students or by permission of the instructor. Class limited to 15-20 students. Signs and symbols in buildings and cities, messages conveyed and purposes for conveying these messages. Readings, photographic reports and minor problem-solving assignments. Lecture, 3 hours per week.

ARCH 374. COMPUTER AIDED ENVIRONMENTAL DESIGN. (3)
Applications of computer-aided design in architecture, using existing problem-solving routines and computer graphic techniques. Prerequisite: Arch. 201, CMSC 103. Lecture. 3 hours per week.

ARCH 376. THE ARCHITECTURAL PROGRAM AS FUNCTIONAL FORM GENERATOR. (3)
The study of architectural programming as derived from functional needs of man in his environment. Analysis, synthesis and evaluation of categories of needs, with concentration on human response to forms generated by programs with emphasis on non-qualifiable human needs. Architecture majors or by permission of instructor. Lecture, seminars, field trips, 3 hours per week.

ARCH 400. ARCHITECTURE STUDIO III. (4)
Continuation of design studio, with emphasis on comprehensive building design and introduction to urban design factors. Prerequisites: Architecture 301 and Architecture 311. Corequisite, Architecture 410, except by permission of the Dean. Lecture, studio, 9 hours per week.

ARCH 401. ARCHITECTURE STUDIO IV. (4)
Continuation of design studio, with emphasis on urban design factors. Prerequisites: Architecture 400 and Architecture 410. Corequisite, Architecture 411, except by permission of the Dean. Lecture, studio, 9 hours per week.

ARCH 410. BUILDING SYSTEMS III. (4)
Applications of principles in architectural structures, environmental controls and construction. Prerequisites: Architecture 301 and Architecture 311. Corequisite, Architecture 400. Lecture, studio, 6 hours per week.

ARCH 411. BUILDING SYSTEMS IV. (4)
Applications of principles and further analysis of systems and hardware in architectural structures, environmental controls and construction. Prerequisites: Architecture 400 and Architecture 410. Corequisite, Architecture 401. Lecture, studio, 6 hours per week.

ARCH 413. STRUCTURAL SYSTEMS IN ARCHITECTURE. (3)
Theory and application of selected complex structural systems as they relate to architectural decisions. Prerequisite: Arch. 410 or by permission of the instructor. Seminar, 3 hours per week.

ARCH 420. HISTORY OF AMERICAN ARCHITECTURE. (3)
Survey history of American Architecture from the 17th century to the present. Lecture, 3 hours per week.

ARCH 422. LATE 18TH CENTURY PARISIAN ARCHITECTURE. (3)
The theoretical background, formulation, and development of late Eighteenth Century architecture in Paris, and its relationship to contemporaneous British and continental developments in architecture and peripheral fields. A reading knowledge of French will be required. Colloquium, independent research. By permission of the instructor.

ARCH 424. HISTORY OF RUSSIAN ARCHITECTURE. (3)
Survey history of Russian architecture from the 10th lecture, 3 hours per week.

ARCH 426. READINGS IN CONTEMPORARY ARCHITECTURE. (3)
Prerequisite: ARCH 326. Readings and analysis of recent architectural criticism. Seminar, three hours per week.

ARCH 427. INDEPENDENT STUDIES IN THE HISTORY OF ARCHITECTURE. (3)
Permission of the Instructor. Independent research in architectural history. Lecture, 3 hours per week.

ARCH 450. INTRODUCTION TO URBAN PLANNING. (3)
Introduction to city planning theory, methodology and techniques dealing with normative, urban, structural, economic, social aspects of the city; urban planning as a process. Architecture majors or by permission of instructor. Lecture, seminar, 3 hours per week.

ARCH 472. ECONOMIC DETERMINANTS OF ARCHITECTURE. (3)
Introduction of economic aspects of present day architecture: government policy, land evaluation, and project financing; construction materials and labor costs; cost analysis and control systems. Architecture majors, except by permission of instructor. Lecture, seminar, 3 hours per week.

ARCH 478. DIRECTED STUDIES IN ARCHITECTURE. (1-4)
Directed study under individual faculty guidance with enrollment limited to advanced undergraduate students. Project proposals must receive a recommendation from the School Curriculum Committee and approval of the Dean of the School prior to registration. Public oral presentation to the faculty of a final report or project will be required at final submission for credit.

ARCH 500. ADVANCED TOPICAL PROBLEMS IN ARCHITECTURE. (6)
Offers several studio options in advanced topical problems from among which the student selects one. Studios are structured under generic titles, and include lectures, field trips, and assigned readings as well as directed independent work. Offered fall term only. Prerequisite: ARCH 401. Lecture, studio 12 hours per week. Architecture majors only.

ARCH 501. ADVANCED TOPICAL PROBLEMS IN ARCHITECTURE. (6)
Offers several studio options in advanced topical problems from among which the student selects one. Studios are structured under generic titles, and include lectures, field trips, assigned readings as well as directed independent work. Offered spring term only. Prerequisite: ARCH 500. Lecture, studio, 12 hours per week.

ARCH 512. ADVANCED STRUCTURAL ANALYSIS IN ARCHITECTURE. (3)
Qualitative and quantitative analysis and design of selected complex structural systems and methods. Prerequisite: ARCH 411. Labs, field trips, 3 hours per week.

ARCH 514. ENVIRONMENTAL SYSTEMS IN ARCHITECTURE. (3)
Qualitative analysis of selected environmental systems as design determinants. Prerequisite: Architecture 411. Lecture, laboratory, 3 hours per week.

ARCH 570. INTRODUCTION TO PROFESSIONAL MANAGEMENT. (2)
Introduction to architectural professional practice management, including social, organizational, project management, legal and cost control aspects of the performance of complex, comprehensive environmental design services. Prerequisite: ARCH 401. Lecture, 2 hours per week.

AGRICULTURAL AND RESOURCE ECONOMICS

AREC 240. ENVIRONMENT AND HUMAN ECOLOGY. (3)
Pollution and human crowding in the modern environment. Causes and ecological costs of these problems. Public policy approaches to the solution of problems in environment and human ecology.

AREC 250. ELEMENTS OF AGRICULTURAL ECONOMICS. (3)
An introduction to economic principles of production, marketing, agricultural prices and incomes, farm labor, credit, agricultural policies, and government programs.

AREC 251. MARKETING OF AGRICULTURAL PRODUCTS. (3)
The development of marketing, its scope, channels, and agencies of distribution, functions, costs methods used and services rendered.

AREC 300. AGRICULTURAL ESTIMATING METHODOLOGY. The history, organization and administration of, and services provided by the statistical reporting service of the U.S. Department of Agriculture and the survey sampling methods used by that agency for computing the department's official statistics on crops livestock and livestock products, production, agricultural prices and farm employment. Emphasis is on statistical procedures used for preparing approximately 350 reports issued annually by the crop reporting board of the U.S. Statistical Reporting Service. (Designed especially for foreign students in FAO and Aid-Program of Technical Cooperation but very beneficial to any student interested in the area.)

AREC 301. AGRICULTURAL ESTIMATING METHODOLOGY. The history, organization and administration of, and services provided by the statistical reporting service of the U.S. Department of Agriculture and the survey sampling methods used by that agency for computing the department's official statistics on crops, livestock and livestock products, production, agricultural prices and farm employment. Emphasis is on statistical procedures used for preparing approximately 350 reports issued annually by the crop reporting board of the U.S. Statistical Reporting Service. (Designed especially for foreign students in FAO and Aid-Program of Technical Cooperation but very beneficial to any student interested in the area.)

AREC 398. SEMINAR. (1)
Students will obtain experience in the selection, preparation and presentation of economic topics and problems which will be subjected to critical analysis.

AREC 399. SPECIAL PROBLEMS. (1-2)
Concentrated reading and study in some phase or problem in agricultural economics.

AREC 404. PRICES OF AGRICULTURAL PRODUCTS. (3)
An introduction to agricultural price behavior. Emphasis is placed on the use of price information in the decision-making process, the relation of supply and demand in determining agricultural prices, and the relation of prices to grade, time, location, and stages of processing in the marketing system. The course includes elementary methods of price analysis, the concept of parity and the role of price support programs in agricultural decisions.

AREC 406. FARM MANAGEMENT. (3)
The organization and operation of the farm business to obtain an income consistent with family resources and objectives. Principles of production economics and other related fields are applied to the individual farm business. Laboratory period will be largely devoted to field trips and other practical exercises.

AREC 407. FINANCIAL ANALYSIS OF THE FARM BUSINESS. (3)
Application of economic principles to develop criteria for a sound farm business, including credit source and use, preparing and filing income tax returns, methods of appraising farm properties, the summary and analysis of farm records, leading to effective control and profitable operation of the farm business.

AREC 414. INTRODUCTION TO AGRICULTURAL BUSINESS MANAGEMENT. (3)
The different forms of businesses are investigated. Management functions, business indicators, measures of performance, and operational analysis are examined. Case studies are used to show applications of management techniques.

AREC 416. MARKETING MANAGEMENT OF AGRI-BUSINESS ENTERPRISES. (3)
Prerequisite: AREC 414 or permission of Instructor. Principles, functions, institutions and channels of marketing viewed from the perspective of a manager of an agricultural business enterprise. The managerial framework for analyzing the entire marketing program of a firm is developed and utilized.

AREC 427. AGRICULTURAL COMMODITY MARKETS—AN ECONOMIC ANALYSIS. (3)
Problems, institutions and functions within marketing systems for poultry and eggs, dairy, grain, horticultural, livestock, tobacco and forestry products. Practical applications of elementary economic theory in a framework for analysis of market problems.

AREC 432. AGRICULTURAL POLICY AND PROGRAMS. (3)
A study of public policies and programs related to the problems of agriculture. Description analysis and appraisal of current policies and programs will be emphasized.

AREC 444. WORLD AGRICULTURAL PRODUCTION AND TRADE. (3)
World production, consumption, and trade patterns for agricultural products. International trade theory applied to agricultural products. National influences on International agricultural trade.

AREC 445. FOREIGN AGRICULTURAL ECONOMIES. (3)
Analysis of the agricultural economy of selected areas of the world. The interrelationships among institutions and values, such as government and religion, and the economics of agricultural organization and production.

AREC 452. ECONOMICS OF RESOURCE DEVELOPMENT. (3)
Economic, political, and institutional factors which influence the use of land resources. Application of elementary economic principles in understanding social conduct concerning the development and use of natural and man-made resources.

AREC 484. INTRODUCTION TO ECONOMETRICS IN AGRICULTURE. (3)
An introduction to the application of econometric techniques to agricultural problems with emphasis on the assumptions and computational techniques necessary to derive statistical estimates, test hypotheses, and make predictions with the use of single equation models. Includes linear and non-linear regression models, internal least squares, discriminant analysis and factor analysis.

AREC 485. APPLICATIONS OF MATHEMATICAL PROGRAMMING IN AGRICULTURE, BUSINESS, AND ECONOMIC ANALYSIS. (3)
This course is designed to train students in the application of mathematical programming (especially linear programming) to solve a wide variety of problems in agriculture, business and economics. The primary emphasis is on setting up problems and interpreting results. The computational facilities of the computer science center are used extensively.

AREC 495. HONORS READING COURSE IN AGRICULTURAL AND RESOURCE ECONOMICS I. (3)
Selected readings in political and economic theory from 1700 to 1850. This course develops a basic understanding of the development of economic and political thought as a foundation for understanding our present society and its cultural heritage. Prerequisite, acceptance in the Honors Program of the Department of Agricultural and Resource Economics.

AREC 496. HONORS READING COURSE IN AGRICULTURAL AND RESOURCE ECONOMICS II. (3)
Selected readings in political and economic theory from 1850 to the present. This course continues the development of a basic understanding of economic and political thought begun in AREC 495 by the examination of modern problems in agricultural and resource economics in

the light of the material read and discussed in AREC 495 and AREC 496. Prerequisite: Successful completion of AREC 495 and registration in the Honors Program of the Department of Agricultural and Resource Economics.

AIR SCIENCE

ARSC 100. GENERAL MILITARY COURSE (FRESHMEN). (1)
General military course—freshmen year, ARSC 100 and 101. In the first two years, cadets meet these classes once per week, in addition to one hour of Leadership and Management Laboratory each week.

ARSC 101. GENERAL MILITARY COURSE (FRESHMEN). (1)
General military course—freshmen year, ARSC 100 and 101. In the first two years, cadets meet these classes once per week, in addition to one hour of Leadership and Management Laboratory each week.

ARSC 200. GENERAL MILITARY COURSE (SOPHOMORES). (1)
General military course—sophomore year, ARSC 200 and 201. In the first two years, cadets meet these classes once per week, in addition to one hour of Leadership and Management Laboratory each week.

ARSC 201. GENERAL MILITARY COURSE (SOPHOMORES). (1)
General military course—sophomore year, ARSC 200 and 201. In the first two years, cadets meet these classes once per week, in addition to one hour of Leadership and Management Laboratory each week.

ARSC 300. PROFESSIONAL OFFICER COURSE (JUNIORS). (3)
The growth and development of aerospace power. Requires three class hours, plus one hour of Leadership and Management Laboratory per week.

ARSC 301. PROFESSIONAL OFFICER COURSE (JUNIORS). (3)
The growth and development of aerospace power. Requires three class hours, plus one hour of Leadership and Management Laboratory per week.

ARSC 302. PROFESSIONAL OFFICER COURSE (SENIORS). (3)
The professional officer. Requires three class hours, plus one hour of Leadership and Management Laboratory per week.

ARSC 303. PROFESSIONAL OFFICER COURSE (SENIORS). (3)
The professional officer. Requires three class hours, plus one hour of Leadership and Management Laboratory per week.

ART EDUCATION

ARTE 100. FUNDAMENTALS OF ART EDUCATION. (3)
Two hours of laboratory and two hours of lecture per week. Fundamental principles of the visual arts for teaching on the elementary level. Elements and principles of design and theory of color. Studio practice in different media.

ART HISTORY

ARTH 100. INTRODUCTION TO ART. (3)
Basic tools of understanding visual art. This course stresses major approaches such as techniques, subject matter, form, and evaluation. Architecture, sculpture, painting, and graphic arts will be discussed. Required of all art majors in the first year.

ARTH 260. HISTORY OF ART. (3)
A survey of western art as expressed through architecture, sculpture and painting. Prehistoric times to renaissance.

ARTH 261. HISTORY OF ART. (3)
A survey of western art as expressed through architecture, sculpture and painting from renaissance to the present.

ARTH 284. INTRODUCTION TO AFRICAN ART. (3)
General concepts preparing the student for a better understanding of African cultures through an appreciation of their art.

ARTH 320. MASTERPIECES OF PAINTING. (3)
A study of the contributions of a few major painters, ranging from Giotto to Titian.

ARTH 321. MASTERPIECES OF PAINTING. (3)
A study of the contributions of a few major painters, ranging from El Greco to Picasso.

ARTH 330. MASTERPIECES OF SCULPTURE. (3)
A study of the contributions of a few major sculptors, ranging from Polykleitos to Ghiberti.

ARTH 331. MASTERPIECES OF SCULPTURE. (3)
A study of the contributions of a few major sculptors, ranging from Ghiberti to Moore.

ARTH 340. MASTERPIECES OF ARCHITECTURE. (3)
A study of great architecture from Stonehenge to the Cathedral at Pisa.

ARTH 341. MASTERPIECES OF ARCHITECTURE. (3)
A study of great architecture from Abbaye-Aux-Hommes to Dulles Airport.

ARTH 402. CLASSICAL ART. (3)
Architecture, sculpture and painting in the classical cultures. First semester will stress Greece.

ARTH 403. CLASSICAL ART. (3)
Architecture, sculpture and painting in the classical cultures. Second semester will stress Rome.

ARTH 404. BRONZE AGE ART. (3)
Art of the Near East, Egypt and Aegean.

ARTH 406. ART OF THE EAST. (3)
Architecture, sculpture and painting. First semester will stress India.

ARTH 407. ART OF THE EAST. (3)
Architecture, sculpture and painting. Second semester will stress China and Japan.

ARTH 410. EARLY CHRISTIAN AND BYZANTINE ART. (3)
Architecture, sculpture, painting, and mosaic of Early Christian Rome, the Near East and the Byzantine Empire.

ARTH 412. MEDIEVAL ART. (3)
Architecture, sculpture and painting in the middle ages. First semester will stress Romanesque.

ARTH 413. MEDIEVAL ART. (3)
Architecture, sculpture and painting in the Middle Ages. Second semester will stress the Gothic Period.

ARTH 416. NORTHERN EUROPEAN PAINTING IN THE 15TH CENTURY. (3)
Painting in the Netherlands, France and Germany.

ARTH 417. NORTHERN EUROPEAN PAINTING IN THE 16TH CENTURY. (3)
Painting in the Netherlands, France and Germany.

ARTH 422. EARLY RENAISSANCE ART IN ITALY. (3)
Architecture, sculpture and painting from about 1400 to 1430.

ARTH 423. EARLY RENAISSANCE ART IN ITALY. (3)
Architecture, sculpture and painting from about 1400 to 1475.

ARTH 424. HIGH RENAISSANCE ART IN ITALY. (3)
Architecture, sculpture and painting from about 1475 to 1500.

ARTH 425. HIGH RENAISSANCE ART IN ITALY. (3)
Architecture, sculpture and painting from about 1500 to 1525.

ARTH 430. EUROPEAN BAROQUE ART. (3)
Architecture, sculpture and painting in the major southern European centers in the 17th century.

ARTH 431. EUROPEAN BAROQUE ART. (3)
Architecture, sculpture and painting of the major northern European centers in the 17th century.

ARTH 434. FRENCH PAINTING. (3)
French painting from 1400 to 1600. From Fouguet to Poussin.

ARTH 435. FRENCH PAINTING. (3)
French painting from 1600 to 1800. From LeBrun to David.

ARTH 440. 19th CENTURY EUROPEAN ART. (3)
Architecture, sculpture and painting in Europe from Neo-Classicism to Romanticism.

ARTH 441. 19th CENTURY EUROPEAN ART. (3)
Architecture, sculpture and painting in Europe from Realism to Impressionism and Symbolism.

ARTH 445. IMPRESSIONISM AND NEO-IMPRESSIONISM. (3)
Prerequisite: ARTH 260, 261 or consent of instructor. History of Impressionism and Neo-Impressionism: artists, styles, art theories, criticism, sources and influence on 20th century.

ARTH 450. 20th CENTURY ART. (3)
Painting, sculpture and architecture from the late 19th century to 1920.

ARTH 451. 20th CENTURY ART. (3)
Painting, sculpture and architecture from 1920 to the present.

ARTH 454. NINETEENTH AND TWENTIETH CENTURY SCULPTURE
Trends in sculpture from Neo-Classicism to the present. Emphasis will be put on the redefinition of sculpture during the 20th century.

ARTH 460. HISTORY OF THE GRAPHIC ARTS. (3)
Prerequisite: ARTH 100, or ARTH 260 and 261, or consent of instructor. Graphic techniques and styles in Europe from 1400 to 1800; contributions of major artists.

ARTH 462. AFRICAN ART. (3)
First semester, the cultures west of the Niger River (Nigeria through Mali) from 400 B.C. to the present. The art is studied through its iconography and function in the culture and the intercultural influences upon the artists, including a study of the societies, cults and ceremonies during which the art was used.

ARTH 463. AFRICAN ART. (3)
Second semester, the cultures East and South of Nigeria. The art is studied through its iconography and function in the culture and the intercultural influences upon the artists, including a study of the societies, cults and ceremonies during which the art was used.

ARTH 464. AFRICAN ART RESEARCH. (3)
Seminar with concentration on particular aspects of African art. The course is given at the Museum of African Art in Washington, D.C.

ARTH 470. LATIN AMERICAN ART. (3)
Art of the Pre-Hispanic and the Colonial periods.

ARTH 471. LATIN AMERICAN ART. (3)
Art of the 19th and 20th centuries.

ARTH 476. HISTORY OF AMERICAN ART. (3)
Architecture, sculpture and painting in the United States from the Colonial period to about 1875.

ARTH 477. HISTORY OF THE AMERICAN ART. (3)
Architecture, sculpture and painting in the United States from about 1875 to the present.

ARTH 489. SPECIAL TOPICS IN ART HISTORY. (3)
Prerequisite: Consent of department head or instructor. May be repeated to a maximum of six credits.

ARTH 498. DIRECTED STUDIES IN ART HISTORY I. (2-3)
For advanced students, by permission of Department Chairman. Course may be repeated for credit if content differs.

ARTH 499. DIRECTED STUDIES IN ART HISTORY II. (2-3)

ART STUDIO

ARTS 100. DESIGN. (3)
Principles and elements of design through manipulation and organization of materials in two and three dimensions.

ARTS 110. DRAWING I. (3)
Six hours per week. An introductory course with a variety of media and related techniques. Problems based on still life, figure and nature.

ARTS 200. INTERMEDIATE DESIGN. (3)
Six hours per week. Prerequisites: ARTS 100, 110. A continuation of Design I with more individually structured problems in terms of form, composition and meaning.

ARTS 210. DRAWING II. (3)
Six hours per week. Prerequisites: ARTS 100, 110. Original compositions from the figure and nature, supplemented by problems of personal and expressive drawing.

ARTS 215. ANATOMICAL DRAWING. (3)
Six hours per week. Prerequisites: ARTS 210 or permission of instructor. A drawing course based on the study of anatomical structure emphasizing the human body.

ARTS 220. PAINTING I. (3)
Six hours per week. Prerequisites: ARTS 100, 110. Basic tools and language of painting. Oil and watercolor.

ARTS 277. ARCHITECTURAL PRESENTATION. (3)
Six hours per week. Prerequisites: ARTS 100, 110. Techniques of wash and watercolor in architectural, interior and landscape architectural rendering.

ARTS 310. DRAWING III. (3)
Six hours per week. Prerequisite: ARTS 210. Emphasis on understanding organic form, as it is related to study from the human figure and to pictorial composition.

ARTS 320. PAINTING II. (3)
Six hours per week. Prerequisites: ARTS 210, 220. Original compositions based upon nature, figure and still life, supplemented by expressive painting. Choice of media.

ARTS 324. PAINTING III. (3)
Six hours per week. Prerequisite: ARTS 320. Creative painting for advanced students. Problems require a knowledge of pictorial structure. Development of personal direction. Choice of media.

ARTS 330. SCULTURE I. (3)
Six hours per week. Prerequisite: ARTS 210. (For students majoring in Art History, by permission of department.) Volumes, masses and planes, based on the use of plastic earths. Simple armature construction and methods of casting.

ARTS 334. SCULPTURE II. (3)
Six hours per week. Prerequisite: ARTS 330. Nature as a point of developing ideas into organic and architectural forms.

ARTS 335. SCULPTURE III. (3)
Six hours per week. Prerequisite: ARTS 334. Problems involving plastic earths and other material capable of being modeled or cast. Choice of individual style encouraged.

ARTS 340. PRINTMAKING I. (3)
Six hours per week. Prerequisite: ARTS 210. (For students majoring in Art History, by permission of department.) Basic printmaking techniques in relief, intaglio, and planographic media.

ARTS 344. PRINTMAKING II. (3)
Six hours per week. Prerequisite: ARTS 210. One print media including extensive study of color processes. Individually structured problems.

ARTS 410. DRAWING IV. (3)
Six hours per week. Prerequisite: ARTS 310. Advanced drawing, with emphasis on human figure, its structure

and organic likeness to forms in nature. Compositional problems deriving from this relationship are also stressed.

ARTS 420. PAINTING IV. (3)
Six hours per week. Prerequisite: ARTS 324. Creative painting. Emphasis on personal direction and self-criticism. Group seminars.

ARTS 430. SCULPTURE IV. (3)
Six hours per week. Prerequisite: ARTS 335. Problems and techniques of newer concepts, utilizing various materials, such as plastics and metals. Technical aspects of welding stressed.

ARTS 440. PRINTMAKING III. (3)
Six hours per week. Prerequisite: ARTS 340 and 344 Contemporary experimental techniques of one print medium with group discussions.

ARTS 441. PRINTMAKING IV. (3)
Six hours per week. Prerequisite: ARTS 440. Continuation of ARTS 440.

ARTS 498. DIRECTED STUDIES IN STUDIO ART. (2-3)
For advanced students, by permission of department chairman. Course may be repeated for credit if content differs.

ASTRONOMY

ASTR 100. INTRODUCTION TO ASTRONOMY. (3)
Every semester. An elementary course in descriptive astronomy, especially appropriate for non-science students. Sun, moon, planets, stars and nebulae, galaxies, evolution. The course is illustrated with slides and demonstrations of instruments.

ASTR 105. INTRODUCTION TO MODERN ASTRONOMY. (3)
Three lectures per week. Prerequisite: ASTR 100. An elementary course in modern astronomy elaborating on some of the topics which could only be mentioned briefly in ASTR 100. Appropriate for non-science students.

ASTR 110. ASTRONOMY LABORATORY. (1)
Two hours of laboratory per week. Prerequisite: Previous or concurrent enrollment in ASTR 100. Exercises include use of photographs of moon, sun, stars, nebulae and galaxies, and spectra; experiments demonstrating scientific concepts used in astronomy; daytime and nighttime observations if weather permits. Appropriate for non-science majors.

ASTR 180. DESCRIPTIVE AND ANALYTICAL ASTRONOMY. (3)
Fall semester. Three lectures per week. A general survery course intended for science majors. Prerequisite: MATH 115 or equivalent; a knowledge of trigonometry and logarithms will be assumed. This introductory course will deal with the sun and the solar system, stars and astrophysics, stellar systems and cosmology. It should not normally be taken by students who have already had ASTR 100 and 105.

ASTR 210. PRACTICAL ASTRONOMY. (2-3)
Prerequisites: ASTR 180 and MATH 140. ASTR 100 and 105 may be substituted for ASTR 180 if approved by instructor. One lecture and one two-hour laboratory per week. 2-3 credits, according to work done. This course is designed primarily for astronomy majors and will give the student familiarity with techniques used by astronomers and an understanding of how astronomical data are obtained. Students registered for 2 credits will not be required to do all the exercises. Topics will include coordinate systems, optics, photometry, binary stars, distance determination, Hertzsprung-Russell diagram, solar observations, moon, galactic structure and galaxies.

ASTR 398. SPECIAL TOPICS IN ASTRONOMY: AS ANNOUNCED. (3)
Prerequisite: Junior standing or consent of instructor. This course is designed primarily for students *not* majoring in astronomy and is suitable for nonscience students. It will concentrate study in some limited field in astronomy which will vary from semester to semester. Possible subjects for study are the solar system, extragalactic astronomy and cosmology, the inconstant universe. Students may repeat the course several times as different topics are offered, up to a maximum of 9 credits.

ASTR 399. HONORS SEMINAR. (1-6)
Credit according to work done. (Cr. Arr.) Enrollment is limited to students admitted to the Honors Program in Astronomy.

ASTR 400. INTRODUCTION TO ASTROPHYSICS I. (3)
Three lectures per week. Pre- or corequisite: PHYS 422 or consent of instructor. Spectroscopy, structure of the atmospheres of the sun and other stars. Observational data and curves of growth. Chemical composition.

ASTR 401. INTRODUCTION TO ASTROPHYSICS II. (3)
Three lectures per week. Prerequisite: ASTR 400. A brief survey of stellar structure and evolution, and of the physics of low-density gases, such as the interstellar medium and the solar atmosphere. Emphasis is placed on a good understanding of a few theoretical concepts that have wide astrophysical applications.

ASTR 410. OBSERVATIONAL ASTRONOMY. (3)
Prerequisites: Working knowledge of calculus, physics through PHYS 284 or 263, and 3 credits of astronomy. An introduction to current methods of obtaining astronomical information including radio, infrared, optical, ultraviolet, and x-ray astronomy. The laboratory work will involve photographic and photoelectric observations with the department's optical telescope and 21-cm line spectroscopy, flux measurements and interferometry with the department's radio telescopes.

ASTR 411. OBSERVATIONAL ASTRONOMY. (3)
Prerequisites: ASTR 410, working knowledge of calculus, physics through PHYS 284, or 263, and 3 credits of astronomy. An introduction to current methods of obtaining astronomical information including radio, infrared, optical, ultra-violet, and x-ray astronomy. The laboratory work will involve photographic and photoelectric observations with the department's optical telescope and 21-cm line spectroscopy, flux measurements and interferometry with the department's radio telescopes. Observatory work on individual projects. Every semester.

ASTRO 420. INTRODUCTION TO GALACTIC RESEARCH. (3)
Three lectures per week. Prerequisite: MATH 141 and at least 12 credits of introductory physics and astronomy courses. Stellar motions, methods of galactic research, study of our own and nearby galaxies, clusters of stars.

ASTRO 450. CELESTIAL MECHANICS. (3)
Three lectures a week. Prerequisite: PHYS 410 or consent of instructor. Celestial mechanics, orbit theory, equations of motion.

ASTR 498. SPECIAL PROBLEMS IN ASTRONOMY. (1-6)
Prerequisite: Major in physics or astronomy and-or consent of advisor. Research or special study. Credit according to work done.

BIOLOGY

BIOL 101. ORGANIZATION AND INTERRELATIONSHIPS IN THE BIOLOGICAL WORLD. (3)
An introductory lecture course for the nonscience major emphasizing the fundamental organization, processes and interdependence of living organisms and the biological effects associated with human influences on the ecocystem.

BOTANY

BOTN 100. GENERAL BOTANY. (4)
Two lectures and two laboratory periods a week. General introduction to botany, touching briefly on all

phases of the subject. Emphasis is on the fundamental biological principles on the higher plants.

H—HONORS

Two lectures, one discussion and one three hour lab. A broad study of plant science with emphasis on current conceptions of major fields of interest. Designed for general honors students, as well as for freshman students with superior training in biology or chemistry, for upper class science majors, and for those students seeking an advanced treatment of BOTN 100.

BOTN 202. THE PLANT KINGDOM. (4)

Two lectures and two laboratory periods a week. Prerequisite: BOTN 100 or equivalent. A brief evolutionary study of algae, fungi, liverworts, mosses, ferns and their relatives, and the seed plants, emphasizing their structure reproduction, habitats, and economic importance.

BOTN 211. PRINCIPLES OF CONSERVATION. (3)

Three lectures per week. A study of the principles of economical use of our natural resources including water, soil, plants, minerals, wildlife and man.

BOTN 212. PLANT TAXONOMY. (3)

One lecture and two laboratory periods a week. Prerequisite: BOTN 100, or equivalent. An introductory study of plant classification, based on the collection and identification of local plants.

BOTN 221. DISEASE OF PLANTS. (4)

Two lectures and two laboratory periods a week. Prerequisite: BOTN 100, or equivalent. An introductory study of the symptoms and casual agents of plant diseases and measures for their control.

BOTN 302. PLANT MICROTECHNIQUE. (3)

One lecture a week. Laboratory periods by arrangement. Prerequisite: BOTN 100 or equivalent and permission of instructor. Preparation of temporary and permanent mounts, including selection of material, killing and fixing, embedding, sectioning, and staining methods; photomicrography, film and paper processing and preparation of photographic illustrations for research publication.

BOTN 389. TUTORIAL READINGS IN BOTANY (Honors Course). (2-3)

Prerequisite: Admission to the Department of Botany Honors Program. A review of the literature dealing with a specific research problem in preparation for original research to be accomplished in Botany 399. Papers will be assigned and discussed in frequent sessions with the instructor.

BOTN 398. SEMINAR. (1)

Repeatable to a maximum of two semester hours credit. Prerequisite: permission of instructor. Discussion and readings on special topics, current literature, or problems and progress in all phases of botany. Minor experimental work may be pursued if facilities and the qualifications of the students permit. For seniors only, majors and minors in botany or biological science.

BOTN 399. RESEARCH PROBLEMS IN BOTANY. (1-3)

Prerequisites: Twenty hours of Botany courses and the permission of the instructor. Research and/or integrated reading in botany under the direction and close supervision of a member of the faculty (May be repeated for a maximum of 6 credits).

BOTN 399H. HONORS RESEARCH. (1-3)

Research problem to follow BOTN 389.

BOTN 401. HISTORY AND PHILOSOPHY OF BOTANY. (1)

Prerequisites: Twenty semester credit hours in biological sciences including BOTN 100 or equivalent.. Discussion of the development and ideas and knowledge about plants, leading to a survey of contemporary work in botanical science.

BOTN 405. SYSTEMATIC BOTANY. (3)

Two two-hour laboratory periods a week. Prerequisite: BOTN 212 or equivalent. An advanced study of the principles of Systematic Botany. Laboratory practice with difficult plant families including grasses, sedges, legumes, and composites. Field trips arranged.

BOTN 407. TEACHING METHODS IN BOTANY. (2)

Four two-hour laboratory demonstration periods per week, for eight weeks. Prerequisite: BOTN 100, or equivalent. A study of the biological principles of common plants, and demonstrations, projects, and visual aids suitable for teaching in primary and secondary schools.

BOTN 411. PLANT ANATOMY. (3)

Summer or University College. Lectures and labs to be arranged. The origin and development of the organs and the tissue systems in the vascular plants.

BOTN 413. PLANT GEOGRAPHY. (2)

Prerequisite: BOTN 100, or equivalent. A study of plant distribution throughout the world and the factors generally associated with such distribution.

BOTN 414. PLANT GENETICS. (3)

Prerequisite: BOTN 100 or equivalent. The basic principles of plant genetics are presented; the mechanics of transmission of the hereditary factors in relation to the life cycle of seed plants, the genetics of specialized organs and tissues, spontaneous and induced mutations of basic and economic significance, gene action, genetic maps, the fundamentals of polyploidy, and genetics in relation to methods of plant breeding are the topics considered.

BOTN 415. PLANTS AND MANKIND. (2)

Prerequisite: BOTN 100 or equivalent. A survey of the plants which are utilized by man, the diversity of such utilization, and their historic and economic significance.

BOTN 416. PRINCIPLES OF PLANT ANATOMY. (4)

Two lectures and two 2-hour laboratory periods per week. The origin and development of cells, tissues, and tissue systems of vascular plants with special emphasis on seed-bearing plants. Particular stress is given to the comparative, systematic, and evolutionary study of the structural components of the plants. Prerequisite: General Botany.

BOTN 417. FIELD BOTANY AND TAXONOMY. (2)

Prerequisite: BOTN 100 or General Biology. Four two-hour laboratory periods a week for eight weeks. The identification of trees, shrubs, and herbs, emphasizing the native plants of Maryland. Manuals, keys, and other techniques will be used. Numerous short field trips will be taken. Each student will make an individual collection.

BOTN 422. RESEARCH METHODS IN PLANT PATHOLOGY. (2)

Two laboratory periods a week. Prerequisite: BOTN 221, or equivalent. Advanced training in the basic research techniques and methods of plant pathology.

BOTN 424. DIAGNOSIS AND CONTROL OF PLANT DISEASES. (3)

Prerequisite: BOTN 221. Three lectures per week. A study of various plant diseases grouped according to the manner in which the host plants are affected. Emphasis will be placed on recognition of symptoms of the various types of diseases and on methods of transmission and control of the pathogens involved.

BOTN 426. MYCOLOGY. (4)

Two lectures and two 2-hour laboratory periods per week. An introductory study of the morphology, classification, life histories, and economics of the fungi.

BOTN 427. FIELD PLANT PATHOLOGY. (1)

Summer session: lecture and laboratory to be arranged. Prerequisite: BOTN 221 or equivalent. The techniques of pesticide evaluation and the identification and control of diseases of Maryland crops are discussed. Offered in alternate years or more frequently with demand.

BOTN 441. PLANT PHYSIOLOGY. (4)

Two lectures and one 4-hour laboratory period a week. Prerequisites: BOTN 001 and General Chemistry. Organic chemistry strongly recommended. A survey of the

general physiological activities of plants.

BOTN 462. PLANT ECOLOGY. (2)
Prerequisite: BOTN 100. Two lectures per week. The dynamics of populations as affected by environmental factors with special emphasis on the structure and composition of natural plant communities, both terrestial and aquatic.

BOTN 463. ECOLOGY OF MARSH AND DUNE VEGETATION. (2)
Two lectures a week. Prerequisite: BOTN 100. An examination of the biology of higher plants in dune and marsh ecosystems.

BOTN 464. PLANT ECOLOGY LABORATORY. (1)
Prerequisite: BOTN 462 or its equivalent or concurrent enrollment therein. One three-hour laboratory period a week. The application of field and experimental methods to the qualitative and quantitative study of vegetation an environmental factors.

BOTN 475. ALGAL SYSTEMATICS. (3)
One lecture and two laboratory periods per week. Prerequisite: BOTN 100. An intensive study of algal structures, morphology, classification and nomenclature including preparation, preservation and identification procedures.

BOTN 477. MARINE PLANT BIOLOGY. (4)
Prerequisite: BOTN 100 or General Biology plus organic chemistry or the consent of the instructor. Five one-hour lectures and three, 3-hour laboratories each week for six weeks. An introduction to the taxonomic, physiological and biochemical characteristics of marine plants which are basic to their role in the ecology of the oceans and estuaries.

BOTN 497. SPECIAL PROBLEMS IN MARINE RESEARCH. (1-3)
Prerequisites: BOTN 100 or general biology plus organic chemistry or consent of instructor. Recommended concurrent or previous enrollment in BOTN 477, Marine Plant Biology. An experimental approach to problems in marine research dealing primarily with the phytoplankton, the larger algae, and marine spermatophytes. Emphasis will be placed on their physiological and biochemical activities.

BUSINESS ADMINISTRATION

BSAD 001. WORKSHOP (3)

BSAD 110. BUSINESS ENTERPRISE (3)
A survey course covering the internal and functional organization of a business enterprise, its organization and control.

BSAD 220. PRINCIPLES OF ACCOUNTING (3)
Prerequisite: Sophomore standing. The principles of accounting for business enterprise and the use of accounting data in making business decisions.
A—Limited to non-accounting majors. See description above for BSAD 220.

BSAD 221. PRINCIPLES OF ACCOUNTING (3)
Prequisite: Sophomore standing. The principles of accounting for business enterprise and the use of accounting data in making business decisions.
A—Limited to non-accounting majors. See description above for BSAD 221.

BSAD 230. BUSINESS STATISTICS I. (3)
Prerequisite: MATH 220 or consent of instructor. An introductory course in statistical concepts including probability from a naive set theory approach, random variables and their properties, and the probability distributions of selected discrete and continuous random variables. The concepts of sampling, sampling distributions, and the application of these concepts to estimation hypothesis testing are included as are brief surveys of the regression and ANOVA models.

BSAD 231. BUSINESS STATISTICS I. (3)
Prerequisite: MATH 141 or consent of instructor. Course description is identicel to BSAD 230, except for prerequisite. This course is designed primarily for majors in Management Science, Statistics, and Information Systems Management.

BSAD 301. ELECTRONIC DATA PROCESSING (3)
Students enrolled in the Department of Business Administration curricula will register for ISFM 401. For detailed information on prerequisites and description of the course, refer to ISFM 401. The credits earned in ISFM 401 may be included in the total credits earned in the area of concentration in business administration.

BSAD 302. ELECTRONIC DATA PROCESSING APPLICATIONS (3)
Students enrolled in the Department of Business Administration curricula will register for IFSM 402. For detailed information on prerequisites and description of the course, refer to IFSM 402. The credits earned in IFSM 402 may be included in the total credits earned in the area of concentration in business administration.

BSAD 310. INTERMEDIATE ACCOUNTING (3)
Prerequisite: BSAD 221 or 221A. A comprehensive study of the theory and problems of evaluation of assets, application of funds, corporation accounts and statements, and the interpretation of accounting statements.

BSAD 311. INTERMEDIATE ACCOUNTING. (3)
Prerequisite: BSAD 221 or 221A. A comprehensive study of the theory and problems of valuation of assets, application of funds, corporation accounts and statements, and the interpretation of accounting statements.

BSAD 320. ACCOUNTING SYSTEMS (3)
Prerequisite: BSAD 221 or 221A. A study of the factors involved in the design and installation of accounting systems: the organization, volume and types of transactions, charts of accounts, accounting manuals, the reporting system.

BSAD 321. COST ACCOUNTING. (3)
Prerequisite: BSAD 221 or 221A. A study of the basic concepts of product costing and cost analysis for management planning and control. Emphasis is placed on the role of the accountant in organizational management, analysis of cost behavior, standard cost, budgeting, responsibility accounting and relevant costs for decision making.

BSAD 323. INCOME TAX ACCOUNTING. (3)
Prerequisite: BSAD 221 or 221A. A study of the important provisions of the Federal Tax Laws, using illustrative examples, selected questions and problems, and the preparation of returns.

BSAD 332. OPERATIONS RESEARCH FOR MANAGEMENT DECISIONS. (3)
Prerequisite: MATH 220, BSAD 230. A survey course in the philosophy, techniques, and applications of operations research to managerial decision making. The course is designed primarily for students not majoring in management science, statistics, or ISM. Techniques covered include, linear programming, transportation and assignment models, Markov processes, inventory and queueing models. Emphasis is placed on formulating and solving decision problems in the functional areas of management.

BSAD 340. BUSINESS FINANCE. (3)
Prerequisite: BSAD 221 or 221A. This course deals with principles and practices involved in the organization, financing, and rehabilitation of business enterprises; the various types of securities and their use in raising funds, apportioning income, risk, and control; intercorporate relations; and new developments. Emphasis is on solution of problems of financial policy faced by management.

BSAD 343. INVESTMENTS. (3)
Prerequisite: BSAD 340. An introduction to financial investments. Topics include securities and securities mar-

kets; investment risks, returns, and constraints; portfolio policies; and institutional investment policies.

BSAD 350. MARKETING PRINCIPLES AND ORGANIZATION. (3)
Prerequisite: ECON 203 or 205. This is an introductory course in the field of marketing. Its purpose is to give a general understanding and appreciation of the forces operating institutions employed, and methods followed in marketing agricultural products, natural products, services and manufactured goods.

BSAD 351. MARKETING MANAGEMENT. (3)
Prerequisites: BSAD 230 and BSAD 350. A study of the work of the marketing division in a going organization. The work of developing organizations and procedures for the control of marketing activities is surveyed. The emphasis throughout the course is placed on the determination of policies, methods, and practices for the effective marketing of various forms of manufactured products.

BSAD 352. ADVERTISING. (3)
Prerequisite: BSAD 350. A study of the role of advertising in the American economy; the impact of advertising on our economic and social life, the methods and techniques currently applied by advertising practitioners; the role of the newspaper, magazine, and other media in the development of an advertising campaign, modern research methods to improve the effectiveness of advertising and the organization of the advertising business.

BSAD 353. RETAIL MANAGEMENT. (3)
Prerequisites: BSAD 220 and 350. Retail store organization, location, layout and store policy; pricing policies, price lines, brands, credit policies, records as a guide to buying; purchasing methods; supervision of selling; training and supervision of retail sales force; and administrative problems.

BSAD 360. PERSONNEL MANAGEMENT. (3)
The basic course in personnel management includes manpower planning, recruitment, selection, development, compensation, and appraisal of employees. Explores the impact of scientific management and unionism on these functions.

BSAD 362. LABOR RELATIONS. (3)
A study of the development and methods of organized groups in industry with reference to the settlement of labor disputes. An economic and legal analysis of labor union and employer association activities, arbitration, mediation, and conciliation; collective bargaining, trade agreements, strikes, boycotts, lockouts, company unions, employee representation, and injunctions.

BSAD 364. MANAGEMENT AND ORGANIZATION THEORY. (3)
The development of management and organization theory, nature of the management process and function and its future development. The role of the manager as an organizer and director, the communication process, goals and responsibilities.

BSAD 370. PRINCIPLES OF TRANSPORTATION. (3)
Prerequisite: ECON 203 or 205. A general course covering the five fields of transportation, their development, service, and regulation.

BSAD 371. TRAFFIC AND PHYSICAL DISTRIBUTION MANAGEMENT. (3)
Prerequisite: Junior standing. Examines the management aspects of the business firm in moving their raw materials and finished goods, through traffic, warehousing, industrial packaging, materials handling, and inventory. A systematic examination of the trade-off possibilities and management alternatives to minimize cost of product flow and maximizing customer service is provided.

BSAD 380. BUSINESS LAW. (3)
Legal aspects of business relationships, contracts, negotiable instruments, agency partnerships, corporations, real and personal property, and sales.

BSAD 381. BUSINESS LAW. (3)
Legal aspects of business relationships, contracts, negotiable instruments, agency, partnerships, corporations, real and personal property, and sales.

BAD 385. PRODUCTION MANAGEMENT (3)
Studies the operation of a manufacturing enterprise, concentrating on the economies of production. Introduces a grounding in analytical method early so that the broad problem areas of system design, operation and control can be based upon the analytical method.

BSAD 390. RISK MANAGEMENT. (3)
Prerequisite: MATH III. Designed to acquaint the student with the nature and significance of risk in business enterprise. The problems relating to both pure and speculative risk in business are considered; and methods of solution involving risk assumption, transfer, reduction, and the use of insurance are analyzed as aids in management decision making.

BSAD 391. PRINCIPLES OF RISK AND INSURANCE. (3)
Prerequisite: MATH III. Emphasizes the use of insurance in resolving problems involving personal and business risks. Life, accident and health, fire and casualty, automobile, and marine insurance are examined as means of dealing with these risks. The theory and legal aspects of insurance are considered, as well as the quantitative measurement of risks.

BSAD 392. INTRODUCTION TO INTERNATIONAL BUSINESS MANAGEMENT. (3)
Prerequisite: ECON 203 or 205. A study of the domestic and foreign environmental factors affecting the international operations of U.S. business firms. The course also covers the administrative aspects of international marketing, finance and management.

BSAD 393. REAL ESTATE PRINCIPLES. (3)
Prerequisite: ECON 203 or 205. This course covers the nature and uses of real estate, real estate as a business, basic principles, construction problems and home ownership, city planning, and public control and ownership of real estate.

BSAD 401. INTRODUCTION TO SYSTEMS ANALYSIS. (3)
Students enrolled in the Department of Business Administration curricula will register for IFSM 436. For detailed information on prerequisites and descriptions of the course, refer to IFSM 436. The credits earned in IFSM 436 may be included in the total credits earned in the area of concentration in business administration.

BSAD 420. UNDERGRADUATE ACCOUNTING SEMINAR. (3)
Prerequisite: Senior standing as an accounting major or consent of instructor. Enrollment limited to upper one-third of senior class. Seminar coverage of outstanding current non-text literature, current problems and case studies in accounting.

BSAD 421. UNDERGRADUATE ACCOUNTING SEMINAR. (3)
Prerequisite: Senior standing as an accounting major or consent of instructor. Enrollment limited to upper one-third of senior class. Seminar coverage of outstanding current non-text literature, current problems and case studies in accounting.

BSAD 422. AUDITING THEORY AND PRACTICE. (3)
Prerequisite: BSAD 311. A study of the principles and problems of auditing and application of accounting principles to the preparation of audit working papers and reports.

BSAD 423. APPRENTICESHIP IN ACCOUNTING. (0)
Prerequisites: Minimum of 20 semester hours in accounting and the consent of the accounting staff. A period of apprenticeship is provided with participating certified accounting firms.

BSAD 424. ADVANCED ACCOUNTING. (3)
Prerequisite: BSAD 311. Advanced accounting theory to specialized problems in partnerships, ventures, consign-

ments, installment sales, insurance, statement of affairs, receiver's accounts, realization and liquidation reports, and consolidation of parent and subsidiary accounts.

BSAD 425. CPA PROBLEMS. (3)
Prerequisite: BSAD 311, or consent of instructor. A study of the nature, form and content of C.P.A. examinations by means of the preparation of solutions to, and an analysis of, a large sample of C.P.A. problems covering the various accounting fields.

BSAD 426. ADVANCED COST ACCOUNTING. (2)
Prerequisite: BSAD 321. A continuation of basic cost accounting with special emphasis on process costs, standard costs, joint costs, and by-product cost.

BSAD 427. ADVANCED AUDITING THEORY AND PRACTICE. (3)
Prerequisite: BSAD 422. Advanced auditing theory and practice and report writing.

BSAD 430. LINEAR STATISTICAL MODELS IN BUSINESS. (3)
Prerequisite: BSAD 231 or consent of instructor. A course in model building involving an intensive study of the general linear stochastic model and the applications of this model to business problems. The model is derived in matrix form and this form is used to analyze both the regression and ANOVA formulations of the general linear model.

BSAD 431. DESIGN OF STATISTICAL EXPERIMENTS IN BUSINESS. (3)
Prerequisite: BSAD 230 or BSAD 231. A survey course covering ANOVA models, basic and advanced experimental design concepts. Non-parametric tests and correlation are emphasized. Applications of these techniques to business problems in primarily the marketing and behavioral sciences are stressed.

BSAD 432. SAMPLE SURVEY DESIGN FOR BUSINESS AND ECONOMICS. (3)
Prerequisite: BSAD 230 or BSAD 231. A course in the design of probability samples. Simple random sampling, stratified random sampling, systematic sampling, and cluster sampling designs are developed and compared for efficiency under varying assumptions about the population sampled. Advanced designs such as multistage cluster sampling and replicated sampling are surveyed. Implementing these techniques in estimating parameters of business models is stressed.

BSAD 433. STATISTICAL DECISION THEORY IN BUSINESS. (3)
Prerequisite: BSAD 230 or BSAD 231. A course in the Bayesian approach to the use of sample information in decision-making. Concepts of loss, risk, decision criteria, expected returns, and expected utility are examined. Application of these concepts to decision-making in the form in various contexts are considered.

BSAD 434. OPERATIONS RESEARCH I. (3)
Prerequisite: BSAD 231 and MATH 240 or permission of instructor. This course is designed primarily for students majoring in Management Science, Statistics and Information Systems Management. It is the first semester of a two semester introduction to the philosophy, techniques and applications of Operations Research. Topics covered include linear programming, postoptimatility analysis, network algorithms, dynamic programming, inventory and equipment replacement models.

BSAD 435. OPERATIONS RESARCH II. (3)
Prerequisite: BSAD 434, or permission of instructor. The second semester of a two-part introduction to Operations Research. The primary emphasis is on stochastic models in management science. Topics include stochastic linear programming, probabilistic dynamic programming, Markov processes, probabilistic inventory models, queueing theory and simulation.

BSAD 436. APPLICATIONS OF MATHEMATICAL PROGRAMMING IN MANAGEMENT SCIENCE. (3)
Prerequisite: BSAD 434 or permission of instructor. A course in the theory and applications of linear, integer, and nonlinear programming models to management decisions. Topics covered include the basic theorems of linear programming; the matrix formulation of the simplex, and dual simplex algorithms; decomposition, cutting plane, branch and bound, and implicit enumeration algorithms; gradient based algorithms; and quadratic programming. Special emphasis is placed upon model formulation and solution using prepared computer algorithms.

BSAD 438. TOPICS IN STATISTICAL ANALYSIS FOR BUSINESS MANAGEMENT. (3)
Prerequisite: BAD 430 and MATH 240 or permission of the instructor. A course in selected topics in statistical analysis which are relevant to management for students with knowledge of basic statistical methods. Topics include evolutionary operation and response surface analysis, forecasting techniques, pathologies of the linear model and their remedies, multivariate statistical models, and non-parametric models.

BSAD 440. FINANCIAL MANAGEMENT. (3)
Prerequisite: BSAD 340. Analysis and discussion of cases and readings relating to financial decisions of the firm. The application of finance concepts to the solution of financial problems is emphasized.

BSAD 443. SECURITY ANALYSIS AND VALUATION. (3)
Prerequisite: BSAD 343. Study and application of the concepts, methods, models, and empirical findings to the analysis, valuation, and selection of securities, especially common stock.

BSAD 445. COMMERCIAL BANK MANAGEMENT. (3)
Prerequisites: BSAD 340 and ECON 430. Analysis and discussion of cases and readings in commercial bank management. The loan function is emphasized; also the management of liquidity reserves, investments for income, and source of funds. Bank objectives, functions, policies, organization, structure, services, and regulation are considered.

BSAD 450. MARKETING RESEARCH METHODS. (3)
Prerequisites: BSAD 230 and BSAD 350. Recommended that BSAD 432 be taken prior to this course. This course is intended to develop skill in the use of scientific methods in the acquisition, analysis and interpretation of marketing data. It covers the specialized fields of marketing research; the planning of survey projects, sample design, tabulation procedure and report preparation.

BSAD 451. CONSUMER ANALYSIS. (3)
Prerequisites: BSAD 350 and 351. Recommended that Psychology 100 and 221 be taken prior to this course. Considers the growing importance of the American consumer in the marketing system and the need to understand him. Topics include the foundation considerations underlying consumer behavior such as economic, social, psychological and cultural factors. Analysis of the consumer in marketing situations—as a buyer and user of products and services—and in relation to the various individual social and marketing factors affecting his behavior. The influence of marketing communications is also considered.

BSAD 452. PROMOTION MANAGEMENT. (3)
Prerequisites: BSAD 350 and BSAD 352. This course is concerned with the way in which business firms use advertising, personal selling, sales promotion, and other methods as part of their marketing program. The case study method is used to present problems taken from actual business practice. Cases studied illustrate problems in the use and coordination of demand stimulation methods as well as analysis and planning. Research, testing and statistical control of promotional activities are also considered.

BSAD 453. INDUSTRIAL MARKETING. (3)
Prerequisites: BSAD 350 plus one other marketing course. The industrial and business sector of the market-

ing system is considered rather than the household or ultimate consumer sector. Industrial products range from raw materials and supplies to the major equipment in a plant, business office, or institution. Topics include product planning and introduction, market analysis and forecasting, channels, pricing, field sales force management, advertising, marketing cost analysis, and government relations. Particular attention is given to industrial, business and institutional buying policies and practice and to the analysis of buyer behavior.

BSAD 454. INTERNATIONAL MARKETING. (3)
Prerequisites: BSAD 350 plus any other marketing course. A study of the marketing functions from the viewpoint of the international executive. In addition to the coverage of international marketing policies relating to product adaptation, data collection and analysis, channels of distribution, pricing, communications, and cost analysis, consideration is given to the cultural, legal, financial, and organizational aspects of international marketing.

BSAD 455. SALES MANAGEMENT. (3)
The role of the sales manager, both at headquarters and in the field, in the management of people, resources and marketing functions. An analysis of the problems involved in sales organization, forecasting, planning, communicating, evaluating and controlling. Attention is given to the application of quantitative techniques and pertinent behavioral science concepts in the management of the sales effort and sales force.

BSAD 460. PERSONNEL MANAGEMENT—ANALYSIS AND PROBLEMS. (3)
Prerequisite: BSAD 360. Recommended, BSAD 230. Research findings, special readings, case analysis, simulation, and field investigations are used to develop a better understanding of personnel problems, alternative solutions and their practical ramificatlons.

BSAD 462. LABOR LEGISLATION. (3)
Case method analysis of the modern law of industrial relations. Cases include the decisions of administrative agencies, courts and arbitration tribunals.

BSAD 464. ORGANIZATIONAL BEHAVIOR. (3)
Prerequisite: BSAD 364. An examination of research and theory concerning the forces which contribute to the behavior of organizational members. Topics covered include: work group behavior, supervisory behavior, intergroup relations, employee goals and attitudes, communication problems, organizational change, and organizational goals and design.

BSAD 467. UNDERGRADUATE SEMINAR IN PERSONNEL MANAGEMENT. (3)
Prerequisite: Consent of instructor. This course is open only to the top one-third of undergraduate majors in personnel and labor relations and is offered during the fall semester of each year. Highlights major developments. Guest lecturers make periodic presentations.

BSAD 470. MOTOR TRANSPORTATION. (3)
Prerequisite: BSAD 370. The development and scope of the motor carrier industry; different types of carriers, economics of motor transportation, service available, federal regulation, highway financing, allocation of cost to highway users, highway barriers.

BSAD 471. WATER TRANSPORTATION. (3)
Prerequisite: BSAD 370. Water carriers of all types, development and types of services, trade routes, inland waterways, company organization, the American Merchant Marine as a factor in national activity.

BSAD 472. COMMERCIAL AIR TRANSPORTATION. (3)
Prerequisite: BSAD 370. The air transportation system of the United States; airways, airports, airlines. Federal regulation of air transportation: economics, equipment, operations, financing, selling of passenger and cargo services. Air mail development and services.

BSAD 473. ADVANCED TRANSPORTATION PROBLEMS. (3)
Prerequisite: BSAD 370. A critical examination of current government transportation policy and proposed solutions. Urban and intercity managerial transport problems are also considered.

BSAD 474. URBAN TRANSPORT AND URBAN DEVELOPMENT. (3)
Prerequisite: ECON 203 or 205. An analysis of the role of urban transportation in present and future urban development. The interaction of transport pricing and service, urban planning, institutional restraints, and public land uses is studied.

BSAD 480. LEGAL ENVIRONMENT OF BUSINESS. (3)
The course examines the principal ideas in law stressing those which are relevant for the modern business executive. Legal reasoning as it has evolved in this country will be one of the central topics of study. Several leading antitrust cases will be studied to illustrate vividly the reasoning process as well as the interplay of business, philosophy, and the various conceptions of the nature of law which give direction to the process. Examination of contemporary legal problems and proposed solutions, especially those most likely to affect the business community, are also covered.

BSAD 481. PUBLIC UTILITIES. (3)
Prerequisite: ECON 203 or 205. Using the regulated industries as specific examples, attention is focused on broad and general problems in such diverse fields as constitutional law, administrative law, public administration, government control of business, advanced economic theory, accounting, valuation and depreciation, taxation, finance, engineering, and management.

BSAD 482. BUSINESS AND GOVERNMENT. (3)
Prerequisite: ECON 203 or 205. A study of the role of government in modern economic life. Social control of business as a remedy for the abuses of business enterprise arising from the decline of competition. Criteria of limitations on government regulation of private enterprise.

BSAD 485. ADVANCED PRODUCTION MANAGEMENT. (3)
Prerequisite: BSAD 385. A study of typical problems encountered by the factory manager. The objective is to develop the ability to analyze and solve problems in management control of production and in the formulation of production policies. Among the topics covered are plant location, production planning and control, methods analysis, and time study.

BSAD 490. URBAN LAND MANAGEMENT. (3)
Covers the managerial and decision making aspects of urban land and property. Included are such subjects as land use and valuation matters.

BSAD 493. HONORS STUDY. (3)
First semester of senior year. Prerequisite: Candidacy for Honors in Business Administration. The course is designed for honors students who have elected to conduct intensive study (independent or group). The student will work under the direct guidance of a faculty advisor and the Chairman of the Honors Committee. They shall determine that the area of study is of a scope and intensity deserving of a candidate's attention. Formal written and/or oral reports on the study may be required by the faculty advisor and/or Chairman of the Honors Program. Group meetings of the candidates may be called at the discretion of the faculty advisors and/or Chairman of the Honors Committee.

BSAD 494. HONORS STUDY. (3)
Second semester of the senior year. Prerequisite: BSAD 493, and continued candidacy for Honors in Business Administration. The student shall continue and complete the research initiated in BSAD 493. Additional reports may be required at the discretion of the faculty advisor and Honors Program Chairman. Group meetings may be held.

BSAD 495. BUSINESS POLICIES. (3)
Prerequisites: BSAD 340, 350, 364 and senior standing. A case study course in which the aim is to have the students apply what they have learned of general management principles and their specialized functional applications to the overall management function in the enterprise.

PHYSICAL THERAPY

BTPT 110. PHYSICAL THERAPY ORIENTATION. (1)
General introductory course to the profession of physical therapy and the relationship to other health professions. Orientation of the student is done by visual aids, discussion and visits to physical therapy departments.

BTPT 111. PHYSICAL THERAPY ORIENTATION. (1)
Continuation of BTPT 110.

CHEMISTRY

CHEM 101. INTRODUCTORY COLLEGE CHEMISTRY. (2)
Two lectures and one recitation per week. An introduction to the study of matter. This course is intended to be followed by CHEM 103. This course may not be taken for credit by students with credit in CHEM 001, 003, 005, 102, 103, or 105 or their equivalents. This course may not be taken to satisfy the General Education science requirement.

CHEM 102. CHEMISTRY OF MAN'S ENVIRONMENT. (4)
Three lectures and one three-hour laboratory per week. Non-mathematical presentation of basic chemical principles and applications in cosmochemistry, geochemistry, biochemistry, and nuclear chemistry. Particular emphasis is placed on the development of man's environment and his effect upon it. This course is for the general student and does not satisfy the requirements of the professional schools.

CHEM 103. COLLEGE CHEMISTRY I. (4)
Three lectures, one recitation, and one three-hour laboratory per week. Prerequisite: CHEM 101 or satisfactory performance on qualifying test. The first semester of a general chemistry sequence intended for students whose curricula require a year or more of chemistry to provide a working knowledge of the science. Nature and composition of matter; chemical calculations; atomic structure; solutions.

CHEM 104. COLLEGE CHEMISTRY II. (4)
Three lectures, one recitation, and one three-hour laboratory per week. Prerequisite: CHEM 103 or 105. A continuation of CHEM 103. The chemistry of carbon, aliphatic compounds; acids and bases, aromatic compounds; stereochemistry; halides; amines and amides; acids, esters; carbohydrates; natural products.

CHEM 105. PRINCIPLES OF COLLEGE CHEMISTRY I. (4)
Three lectures, one recitation, and one three-hour laboratory per week. A more rigorous treatment of the material of CHEM 103. Admission by invitation of the Chemistry Department based on performance on a qualifying test.

CHEM 106. PRINCIPLES OF COLLEGE CHEMISTRY II. (4)
Three lectures, one recitation, and one three-hour laboratory per week. Prerequisite: CHEM 103 or 105 and consent of the Chemistry Department. A more rigorous treatment of the material of CHEM 104.

CHEM 107. CHEMISTRY AND MAN. (3)
Lecture course intended for non-chemistry majors. The impact of chemistry on man. The chemistry of the universe around us, of life, of the body, of the mind, of food and drugs, of consumer goods, and of everyday living. Basic knowledge of chemistry helpful to the intelligent citizen of today.

CHEM 201. COLLEGE CHEMISTRY III. (3)
Three lectures and one recitation per week. Prerequisite: CHEM 104 or 106. A continuation of CHEM 104. Organic chemistry, with emphasis on molecular structure; stereochemistry, conformational analysis; substitution reactions; carbonium ions; spectroscopy; aromaticity; synthetic processes. This course must be accompanied by CHEM 202 unless credit for CHEM 202 has previously been established.

CHEM 202. COLLEGE CHEMISTRY LABORATORY III. (2)
One lecture and one three-hour laboratory per week. Prerequisite: CHEM 104 or 106. A laboratory course to accompany CHEM 201. This course must be accompanied by CHEM 201.

CHEM 203. COLLEGE CHEMISTRY IV. (3)
Three lectures and one recitation per week. Prerequisite: CHEM 104 or 106. Introductory analytical and theoretical chemistry. Bonding theory; electrochemistry; molecular energetics and structure; chemical dynamics; equilibrium; determination of composition of matter. This course must be accompanied by CHEM 204 unless credit for CHEM 204 has previously been established.

CHEM 204. COLLEGE CHEMISTRY LABORATORY IV. (2)
One lecture and one three-hour laboratory per week. Prerequisite: CHEM 104 or 106. A laboratory course to accompany CHEM 203. This course must be accompanied by CHEM 203.

CHEM 211. PRINCIPLES OF COLLEGE CHEMISTRY III. (3)
Three lectures and one recitation per week. Prerequisite: CHEM 104 or 106 and consent of the Chemistry Department. A more rigorous treatment of the material of CHEM 201. This course must be accompanied by CHEM 212 unless credit for CHEM 212 has previously been established.

CHEM 212. PRINCIPLES OF COLLEGE CHEMISTRY LABORATORY III. (2)
One lecture and one three-hour laboratory per week. Prerequisite: CHEM 104 or 106 and consent of the Chemistry Department. A more rigorous treatment of the material of CHEM 202. This course must be accompanied by CHEM 211.

CHEM 213. PRINCIPLES OF COLLEGE CHEMISTRY IV. (3)
Three lectures and one recitation per week. Prerequisite: CHEM 104 or 106 and consent of Chemistry Department. A more rigorous treatment of the material of CHEM 203. This course must be accompanied by CHEM 214 unless credit for CHEM 214 has previously been established.

CHEM 214. PRINCIPLES OF COLLEGE CHEMISTRY LABORATORY IV. (2)
One lecture and one three-hour laboratory per week. Prerequisite: CHEM 104 or 106 and consent of the Chemistry Department. A more rigorous treatment of the material of CHEM 204. This course must be accompanied by CHEM 213.

CHEM 302. RADIOCHEMICAL SAFETY PROCEDURES. (1)
One lecture per week. A lecture and demonstration course. Radiation hazards, principles and practices of radiation safety, federal (AEC, ICC) codes and state public health.

CHEM 321. QUANTITATIVE ANALYSIS. (4)
Two lectures and two three-hour laboratory periods per week. Prerequisite: CHEM 203-204 or 213-214. Volumetric, gravimetric, electrometric, and colorimetric methods. Intended for students in agricultural chemistry, general physical science, science education, etc.

CHEM 398. SPECIAL PROJECTS. (2)
Honors projects for undergraduate students.

CHEM 399. INTRODUCTION TO CHEMICAL RESEARCH. (1-2)
Prerequisite: Junior standing. Registration only upon consent of the course coordinator. The course will allow students to conduct basic research under the supervision of a member of the department. May be repeated for credit to a maximum of four credits.

CHEM 401. INORGANIC CHEMISTRY. (3)
Three lectures per week. Prerequisite: CHEM 481.

CHEM 403. RADIOCHEMISTRY. (3)
Three lectures per week. Prerequisite: One year of college chemistry and one year of college physics. Radioactive decay; introduction to properties of atomic nuclei; nuclear processes in cosmology; chemical, biomedical and environmental applications of radioactivity; nuclear processes as chemical tools; interaction of radiation with matter.

CHEM 421. ADVANCED QUANTITATIVE ANALYSIS. (3)
Two lectures and one three-hour laboratory period per week. Prerequisite or corequisite: CHEM 482. Volumetric, gravimetric, electrometric, and colorimetric methods.

CHEM 423. ORGANIC QUANTITATIVE ANALYSIS. (2)
Two three-hour laboratory periods per week. Prerequisites: CHEM 203-204 or 213-214, and consent of the instructor. The semi-micro determination of carbon, hydrogen, nitrogen, halogen and certain functional groups.

CHEM 430. CHEMICAL MEASUREMENTS LABORATORY I. (3)
One lecture and two three-hour laboratory periods per week. Corequisite: CHEM 481. An introduction to the principles and applications of quantitative techniques useful in chemistry, with emphasis on modern instrumentation. Computer programming, electronic circuits, spectroscopy, chemical separations.

CHEM 431. CHEMICAL MEASUREMENTS LABORATORY II. (3)
One lecture and two three-hour laboratory periods per week. Prerequisite: CHEM 481; Corerequisite: CHEM 482. An introduction to the principles and applications of quantitative techniques useful in chemistry, with emphasis on modern instrumentation. Communications techniques, vacuum systems, thermochemistry, phase equilibria, chemical kinetics, electrochemistry.

CHEM 433. CHEMICAL SYNTHESIS. (3)
One lecture and two three-hour laboratory periods per week. Prerequisite: CHEM 201-202 or 211-212, and 203-204 or 213-214.

CHEM 441. ADVANCED ORGANIC CHEMISTRY. (2)
Two lectures per week. Prerequisite: CHEM 203 or 213.

CHEM 443. QUALITATIVE ORGANIC ANALYSIS. (3)
One lecture and two-three hour laboratory periods per week. Prerequisite: CHEM 201-202 or 211-212, and 203-204 or 213-214. The systematic identification of organic compounds.

CHEM 461. BIOCHEMISTRY I. (3)
Three lectures per week. Prerequisite: CHEM 203-204 or 213-214, or permission of instructor. A comprehensive introduction to general biochemistry wherein the chemistry and metabolism of carbohydrates, lipids, nucleic acids, and proteins are discussed.

CHEM 462. BIOCHEMISTRY II. (3)
Three lectures per week. Prerequisite: CHEM 461. A continuation of CHEM 461.

CHEM 463. BIOCHEMISTRY LABORATORY I. (2)
Two three-hour laboratory periods per week. Prerequisite: CHEM 461 or concurrent registration in CHEM 461.

CHEM 464. BIOCHEMISTRY LABORATORY II. (2)
Two three-hour laboratory periods per week. Prerequisite: CHEM 462 or concurrent registration in CHEM 462, and CHEM 430 or CHEM 463.

CHEM 472. PRINCIPLES OF GEOCHEMISTRY. (3)
Three lectures per week. Prerequisite: CHEM 104 or equivalent, and senior standing. A survey of historical and modern theories of the origin of the universe and the solar system. The origin of elements and their distributions in space, on extra-terrestrial bodies and on earth. Discussion of the origin of igneous rocks, of the physical and chemical factors governing development and distribution of sedimentary rocks, of the oceans, and of the atmosphere. Organic sediments, the internal structures of Earth and the planets, the role of isotopes in geothermometry and in the solution of other problems.

CHEM 473. GEOCHEMISTRY OF SOLIDS. (3)
Three lectures per week. Prerequisite: CHEM 482 or GEOL 422. Principles of crystal chemistry applied to structures, properties and reactions of minerals and non-metallic solids. Emphasis is placed on the relation of structural stability to bonding, ionic size, charge, order-disorder, polymorphism, and isomorphism.

CHEM 474. ENVIRONMENTAL CHEMISTRY. (3)
Three lectures per week. Prerequisite: CHEM 481, or equivalent. The sources of various elements and chemical reactions between them in the atmosphere and hydrosphere are treated. Causes and biological effects of air and water pollution by certain elements are discussed.

CHEM 475. CHEMICAL OCEANOGRAPHY. (3)
Three lectures per week. Prerequisite: CHEM 103 or equivalent, and one additional semester of physical science. An introduction to physical, chemical and geological processes that occur in the marine environment including physical and chemical properties of sea water, geology of the sea floor, general circulation of the ocean, currents, waves, and tides.

CHEM 481. PHYSICAL CHEMISTRY I. (3)
Three lectures per week. Prerequisites: CHEM 203-204 or 213-214, MATH 141, PHYS 142 or PHYS 263 (PHYS 263 may be taken concurrently with CHEM 481) or consent of instructor. A course primarily for chemists and chemical engineers.

CHEM 482. PHYSICAL CHEMISTRY II. (3)
Three lectures per week. Prerequisite: CHEM 481 or consent of instructor. A course primarily for chemists and chemical engineers.

CHEM 485. ADVANCED PHYSICAL CHEMISTRY. (2)
Prerequisite: CHEM 482. Quantum chemistry and other selected topics.

CHEM 486. ADVANCED PHYSICAL CHEMISTRY LABORATORY. (2)
Two three-hour laboratory periods per week. Prerequisites: CHEM 482 and consent of instructor.

CHEM 498. SPECIAL TOPICS IN CHEMISTRY. (3)
Three lectures or two lectures and one three-hour laboratory per week. Prerequisite varies with the nature of the topic being considered. Course may be repeated for credit if the subject matter is substantially different, but not more than three credits may be accepted in satisfaction of major supporting area requirements for chemistry majors.

CHINESE

CHIN 101. INTENSIVE ELEMENTARY CHINESE. (6)
Introduction to reading, writing, and speaking Chinese with an emphasis on mastering the essentials of pronunciation, basic characters and structural patterns. Eight hours per week.

CHIN 102. INTENSIVE ELEMENTARY CHINESE. (6)
Introduction to reading, writing, and speaking Chinese with an emphasis on mastering the essential of pronunciation, basic characters and structural patterns. Eight hours per week.

CHIN 103. REVIEW OF ELEMENTARY CHINESE. (3)
Designed for students with prior experience with the Chinese language, either written or spoken, who have need of further preparation before entering CHIN 201. CHIN 103 may be taken simultaneously with CHIN 201, 104 with 202, on recommendation of the director of the Chinese program.

CHIN 104. REVIEW OF ELEMENTARY CHINESE. (3)
Designed for students with prior experience with the Chinese language, either written or spoken, who have need of further preparation before entering CHIN 201.

CHIN 103 may be taken simultaneously with CHIN 201, 104 with 202, on recommendation of the director of the Chinese program.

CHIN 201. INTERMEDIATE CHINESE. (3)
Three recitations per week; additional electronic laboratory in CHIN 201. Prerequisite: CHIN 102 or equivalent. Reading of texts designed to give some knowledge of Chinese life, thought and culture.

CHIN 202. INTERMEDIATE CHINESE. (3)
Three recitations per week. Prerequisite: CHIN 201 or equivalent. Reading of texts de signed to give some knowledge of Chinese life, thought and culture.

CHIN 301. ADVANCED CHINESE. (3)
Advanced level of study of language patterns and syntax as well as development of vocabulary and skills necessary to prepare the student for eventual use of original sources. Prerequisite: CHIN 201, 202, or permission of the director of the Chinese program.

CHIN 302. ADVANCED CHINESE. (3)
Advanced level of study of language patterns and syntax as well as development of vocabulary and skills necessary to prepare the student for eventual use of original sources. Prerequisite: CHIN 201, 202, or permission of the director of the Chinese program.

CHIN 401. READINGS FROM CHINESE HISTORY. (3)
Prerequisite: CHIN 302 or equivalent. Based on anthology of historians from the Chou to the Ching dynasties.

CHIN 402. READINGS FROM CHINESE HISTORY. (3)
Prerequisite: CHIN 302 or equivalent. Based on anthology of historians from the Chou to the Ching dynasties.

CHIN 411. CHINESE CIVILIZATION. (3)
This courses supplements GEOG 422: Cultural Geography of China and Japan. It deals with Chinese literature, art, folklore, history, government, and great men. The course is given in English.

CHIN 412. CHINESE CIVILIZATION. (3)
Developments in Chince since 1911. The course is given in English.

CHIN 421. CHINESE LINGUISTICS. (3)
Prerequisite: CHIN 102 or equivalent.

CHIN 422. CHINESE LINGUISTICS. (3)
Prerequisite: CHIN 102 or equivalent.

COLLEGE AIMS

CLAM 108. COLLEGE AIMS. (1)
This course is primarily aimed at orienting new students toward the practice of efficient study techniques. It will be concerned with such topics as: How to study and develop higher level work skills; diagnosing and remedying skill disabilities; handling problem area which distracts students from their studies.

COMPARATIVE LITERATURE

CMLT 401. INTRODUCTORY SURVEY OF COMPARATIVE LITERATURE. (3)
Survey of the background of European literature through study of Greek and Latin literature in English translations, discussing the debt of modern literature to the ancients.

CMLT 402. INTRODUCTORY SURVEY OF COMPARATIVE LITERATURE. (3)
Study of the medieval and modern continental literature.

CMLT 411. THE GREEK DRAMA. (3)
The chief works of Aeschylus, Sophocles, Euripides, and Aristophanes in English translations. Emphasis on the historic background, on dramatic structure, and on the effect of the Attic drama upon the mind of the civilized world.

CMLT 415. THE OLD TESTAMENT AS LITERATURE. (3)
A study of sources, development and literary types.

CMLT 416. NEW TESTAMENT AS LITERATURE. (3)
A study of the books of the New Testament, with attention to the relevant historical background and to the transmission of the text. A knowledge of Greek is helpful, but not essential.

CMLT 421. THE CLASSICAL TRADITION AND ITS INFLUENCE IN THE MIDDLE AGES AND THE RENAISSANCE. (3)
Emphasis on major writers. Reading knowledge of Greek or Latin required.

CMLT 422. THE CLASSICAL TRADITION AND ITS INFLUENCE IN THE MIDDLE AGES AND THE RENAISSANCE. (3)
Emphasis on major writers. Reading knowledge of Greek or Latin required.

CMLT 430. LITERATURE OF THE MIDDLE AGES. (3)
Narrative, dramatic and lyric literature of the middle ages studied in translation.

CMLT 433. DANTE AND THE ROMANCE TRADITION. (3)
A reading of the *Divine Comedy* to enlighten the discovery of reality in western literature.

CMLT 461. ROMANTICISM—EARLY STAGES. (3)
Emphasis on England, France and Germany. Reading knowledge of French or German required.

CMLT 462. ROMANTICISM—FLOWERING AND INFLUENCE. (3)
Emphasis on England, France and Germany. Reading knowledge of French or German required.

CMLT 469. THE CONTINENTAL NOVEL. (3)
The novel in translation from Stendhal through the Existentialists, selected from literatures of France, Germany, Italy, Russia, and Spain.

CMLT 470. IBSEN AND THE CONTINENTAL DRAMA. (3)
Emphasis on the major work of Ibsen, with some attention given to selected predecessors, contemporaries and successors.

CMLT 479. MAJOR CONTEMPORARY AUTHORS. (3)

CMLT 488. GENRES. (3)
A study of a recognized literary form, such as tragedy, epic, satire, literary criticism, comedy, tragicomedy, etc. The course may be repeated for cumulative credit up to six hours when different material is presented.

CMLT 489. MAJOR WRITERS. (3)
Each semester two major writers from different cultures and languages will be studied. Authors will be chosen on the basis of significant relationships of cultural and aesthetic contexts, analogies between their respective works, and the importance of each writer to his literary tradition.

CMLT 496. CONFERENCE COURSE IN COMPARATIVE LITERATURE. (3)
Second semester. A tutorial type discussion course, correlating the courses in various literatures which the student has previously taken with the primary themes and masterpieces of world literature. This course is required of undergraduate majors in Comparative Literature, but must not be taken until the final year of the student's program.

CMLT 498. SELECTED TOPICS IN COMPARATIVE LITERATURE. (3)

COMPUTER SCIENCE

CMSC 100. INTRODUCTION TO USE OF THE DIGITAL COMPUTER. (1)
An introduction to the use of FORTRAN for solution of simple computational tasks. The use of a conversational mode to simplify the computational process will be emphasized. Where possible students will be assigned to sections of comparable background. Examples and problems for the sections will be chosen appropriate to the background of the students.

CMSC 103. INTRODUCTORY ALGORITHMIC METHODS. (3)
Two lectures and one two-hour laboratory period per week. Prerequisite: MATH 111 or equivalent. Recommended for students not majoring in mathematics, the physical sciences or engineering. Study of the algorithmic approach in the analysis of problems and their computational solution. Definition and use of a particular algorithmic language. Computer projects based on elementary algebra and probability; linear equations and matrices; and the ordering, searching, sorting, and manipulating of data.

CMSC 110. ELEMENTARY ALGORITHMIC ANALYSIS. (3)
Two lectures and one two-hour laboratory period per week. Pre- or corequisite: MATH 141 or equivalent. Recommended for students majoring in mathematics, the physical sciences or engineering. Concept and properties of an algorithm, language and notation for describing algorithms, analysis of computational problems and development of algorithms for their solution, use of specific algorithms for their solution, use of specific algorithmic languages in solving problems from numerical mathematics, completion of several projects using a computer.

CMSC 210. LANGUAGE AND STRUCTURE OF COMPUTERS. (3)
Two lectures and one two-hour laboratory period per week. Prerequisite: CMSC 103 or CMSC 110 or equivalent. Logical basis of computer structure, machine presentation of numbers and characters, flow of control, instruction codes, arithmetic and logical operations, indexing and indirect addressing, input-output, pushdown stacks, symbolic representation of programs and assembly systems, subroutine linkage, macros, interpretive systems, and recent advances in computer organization. Several computer projects to illustrate basic concepts.

CMSC 268. NUMERICAL CALCULUS LABORATORY. (1-2)
Two hours laboratory per week for each credit hour. Prerequisite: MATH 240, or concurrent registration therein and CMSC 110, or equivalents. Laboratory work in the development of algorithmic solutions of problems taken from numerical calculus with emphasis on efficiency of computation, and the control of errors. Basic one-credit laboratory includes completion of several machine projects on material related to MATH 240. Second credit involves more comprehensive projects based on similar or related material.

CMSC 340. INTRODUCTION TO DISCRETE STRUCTURES. (3)
Prerequisite: CMSC 110 or equivalent. This is the same course as ENEE 450. Review of set algebra including relations, partial ordering and mappings. Algebraic structures including semigroups and groups. Graph theory including trees and weighted graphs. Boolean algebra and propositional logic. Applications of these structures to various areas of computer science and computer engineering.

CMSC 388. SPECIAL COMPUTATIONAL LABORATORY. (1-2)
Two hours laboratory per week for each credit hour. Prerequisite: CMSC 103 or equivalent. Arranged for special groups of students to give experience in developing algorithmic solutions of problems or using particular computational systems. May be taken for cumulative credit up to a maximum of six hours where different material is covered.

CMSC 400. INTRODUCTION TO COMPUTER LANGUAGES AND SYSTEMS. (3)
Prerequisite: MATH 241 or equivalent. A terminal course suitable for non-CMSC majors with no programming background. Organization and characteristics of computers. Procedure oriented and assembly languages. Representation of data, characters and instructions. Introduction to logic design and systems organization. Macro definition and generation. Program segmentation and linkage. Extensive use of the computer to complete projects illustrating programming techniques and machine structure. (CMSC400 may not be counted for credit in the graduate program in Computer Science.)

CMSC 410. COMPUTER ORGANIZATION. (3)
Prerequisite: CMSC 210 or equivalent. This is the same course as ENEE 440. Introduction. Computer elements. Parallel adders and subtracters. Micro-operations. Sequences. Computer simulation. Organization of a commercially available stored program computer. Microprogrammed computers. A large-scale batch-processing system.

CMSC 420. DATA AND STORAGE STRUCTURES. (3)
Prerequisite: CMSC 210 and CMSC 340 or equivalent. A study of intrinsic structures of data, such as arrays, strings, trees, and lists, and their relation to storage media. Representation of data structures in storage by records, files, etc. Special storage structures such as content addressed, trie, and associative memories. Referencing, processing, and management techniques based on the structuring, e.g., list processing. Storage and accessing efficiency, as well as dynamic flexibility of various methods.

CMSC 440. STRUCTURE OF PROGRAMMING LANGUAGES. (3)
Prerequisite: CMSC 210 or equivalent. Formal definition of languages including specification of syntax and semantics. Syntactic structure and semantics of simple statements including precedence, infix, prefix, and postfix notation. Global structure and semantics of algorithmic languages including declarations and storage allocation, grouping of statements and binding time of constituents, subroutines, coroutines, tasks and parameters. List processing and data description languages.

CMSC 450. ELEMENTARY LOGIC AND ALGORITHMS. (3)
Prerequisite: MATH 240 or consent of instructor. This is the same course as MATH 444. An elementary development of propositional logic, predicate logic, set algebra, and Boolean algebra, with a discussion of Markov algorithms,Turing machines and recursive functions. Topics include Post productions, word problems, and formal languages.

CMSC 460. COMPUTATIONAL METHODS. (3)
Prerequisite: MATH 241 or 452, and CMSC 110 or equivalent. Study of the basic computational methods for interpolation, least squares, approximation, numerical quadrature, numerical solution of polynomial and transcendental equations, systems of linear equations and initial value problems for ordinary differential equations. The emphasis is placed on a discussion of the methods and their computational properties rather than on their analytic aspects. Intended primarily for students in the physical and engineering sciences. This course should not be taken by students who have passed MATH/CMSC 470. (Listed also as MATH 460.)

CMSC 470. INTRODUCTION TO NUMERICAL ANALYSIS. (3)
Prerequisite: MATH 241. Introduction to the analysis of numerical methods for solving linear systems of equations, nonlinear equations in one variable, interpolation and approximation problems and the solution of initial value problems for ordinary differential equations. Stress is placed on providing the student with a good understanding of the theoretical foundations of the various methods. Intended primarily for students in mathematics, applied mathematics, and computer science. This course should not be taken by students who have passed MATH/CMSC 460. (Listed also as MATH 470.)

CMSC 485. SIMULATION OF CONTINUOUS SYSTEMS. (3)
Prerequisites: CMSC 110 and MATH 246, or equivalent. Introduction to digital simulation; simulation by MIMIC programming; simulation by FORTRAN programming;

simulation by DSL-90 (or CSMP) programming; logic and construction of a simulation processor; similarity between digital simulations of continuous and discrete systems.

CMSC 498. SPECIAL PROBLEMS IN COMPUTER SCIENCE. (1-3)
Prerequisite: Permission of instructor. An individualized course designed to allow a student or students to pursue a specialized topic or project under the supervision of the senior staff. Credit according to work done.

CONSUMER ECONOMICS

CNEC 385. JUNIOR HONORS SEMINAR. (1)
Spring semester. Limited to juniors in the departmental Honors Program. Readings, reports and discussion of selected topics.

CNEC 431. THE CONSUMER AND THE LAW. (3)
Three lectures a week. A study of legislation affecting consumer goods and services. Topics covered include product safety and liability, packaging and labeling, deceptive advertising, and consumer credit. The implications of such legislation for consumer welfare with particular emphasis on the disadvantaged groups in our society will be examined.

CNEC 435. ECONOMICS OF CONSUMPTION. (3)
Spring semester. Three lectures per week. Prerequisites: ECON 201 and 203 or ECON 205 for non-majors. The application of economic theory to a study of consumer decision-making and its role in a market economy at both the individual and aggregate levels. Topics covered include empirical studies of consumer spending and saving, the consumer in the market and collective consumption.

CNEC 437. CONSUMER BEHAVIOR. (3)
Three lectures per week. Prerequisites: PSYC 100 and SOCY 100. An application of the behavioral sciences to a study of consumer behavior. Current theories, models and empirical research findings are explored.

CNEC 488. SENIOR HONORS THESIS. (1-4)
Limited to students in the departmental Honors Program. An independent literary, laboratory or field study, conducted throughout the student's senior year. Student should register in both fall and spring.

CNEC 498. SPECIAL STUDIES. (2-4)
Independent study by an individual student or by a group of students in advanced work not otherwise provided in the department. Students must prepare a description of the study they wish to undertake. The plan must be approved by the faculty directing the study and the department chairman.

CRAFTS

CRAF 101. CRAFT FUNDAMENTALS AND MATERIALS. (3)
Three laboratory periods. Prerequisite: APDS 101 or equivalent. Introduction to materials and techniques. Recognition of design limitations imposed by inherent quality of materials.

CRAF 102. RECREATIONAL CRAFTS. (2)
Two laboratory periods. Problems to encourage creative expression in variety of materials. Emphasis on achievement of aesthetic quality in use of easily available materials, simple tools. Suitable for nonmajors.

CRAF 202. CREATIVE CRAFTS. (3)
Three studio periods. Prerequisite: CRAF 101 or 102. Problems to stimulate creative experimentation as approach to design. Work with paper, fabric, clay, wood, metal, glass, etc.

CRAF 220. CERAMICS I—MATERIALS AND PROCESSES. (3)
Three studio periods. Prerequisites: APDS 101 and consent of the instructor. Fundamental preparation and use of clay. Execution of original designs while developing elementary skills in the production of clay sculpture and pottery.

CRAF 230. METALRY I. (3)
Three studio periods. Prerequisites: APDS 101 plus one additional design course, or equivalent. Opportunity to develop basic skills in the execution of creatively conceived jewelry design problems in copper, pewter, silver and gold. Standards of craftsmanship as they relate to design quality.

CRAF 240. WEAVING. (3)
Three studio periods. Prerequisites: APDS 101, 102, or equivalent, TEXT 105. Basic weaves, patterns drafts. Creative weaving as a study of texture, pattern and color appropriate to purpose.

CRAF 241. DECORATIVE TEXTILES. (3)
Three studio periods. Prerequisites: APDS 101, 102 or equivalent. Execution of original designs appropriate to textile decoration, fibers and fabrics and to the process involved (i.e. batik, block printing, silk screen, stitchery, and applique).

CRAF 320. ADVANCED CERAMICS I. (3)
Three studio periods. Prerequisite: CRAF 220. Experience in experimental development of body and textures, glazes and colors, and their utilization in clay products of original design. Calculation of body and glaze composition.

CRAF 330. ADVANCED METALRY I. (3)
Three studio periods. Prerequisite: CRAF 230. Advanced application of skills to design and fabrication of metals; jewelry, stone setting, metal casting, and forming.

CRAF 340. ADVANCED WEAVING/TEXTILE DESIGN. (3)
Three studio periods. Prerequisite: CRAF 240. Execution of original textile designs which reflect the demands both of the custom market and of mass production. Problems chosen with the consent of instructor.

CRAF 341. ADVANCED WEAVING/TEXTILE DESIGN. (3)
Two studio periods. Prerequisite: CRAF 241. Execution of original textile designs which reflect the demands both of the custom market and of mass production. Problems chosen with the consent of instructor.

CRAF 420. ADVANCED CERAMICS II. (3)
Three studio periods. Prerequisite: CRAF 330. Experience in experimental development of body and textures, glazes and colors and their utilization in clay products of original design. Calculation of body and glaze composition.

CRAF 428. INDIVIDUAL PROBLEMS IN CERAMICS. (3)
Prerequisites: CRAF 220, CRAF 320, CRAF 420. Open to students with demonstrated ability* and with the potential for a high level of achievement in studio production or in research. Total undergraduate credit permitted in all individual problems courses in crafts is a maximum of nine hours. *Consent of crafts faculty.* No less than B average on prerequisites and presentation of work for evaluation.

CRAF 430. ADVANCED METALRY II. (3)
Two studio periods. Prerequisite: CRAF 330. Advanced application of skills to the design and fabrication of metals; jewelry, stone setting, metal casting, cloisonne. Hand-raised hollow.

CRAF 438. INDIVIDUAL PROBLEMS IN METALRY. (3)
Prerequisites: CRAF 230, CRAF 330, CRAF 430. Open to students with demonstrated ability* and with the potential for a high level of achievement in studio production or in research. Total undergraduate credit permitted in all individual problems courses in crafts as a maximum of nine hours. Consent of crafts faculty. No less than B average on prerequisites and presentation of work for evaluation.

CRAF 448. INDIVIDUAL PROBLEMS IN TEXTILE DESIGN. (3)
Prerequisites: CRAF 240 or CRAF 241 and CRAF 340 or CRAF 341. Open to students with demonstrated ability* and with the potential for a high level of achievement in studio production or in research. Total undergraduate credit permitted in all individual problems courses in crafts is a maximum of nine hours. Consent of crafts faculty. No less than B average on prerequisites and presentation of work for evaluation.

CRIMINAL JUSTICE AND CRIMINOLOGY

CRIM 220. CRIMINOLOGY. (3)
Prerequisites: SOCY 100 and sophomore standing. Criminal behavior and the methods of its study; causation; typologies of criminal acts and offenders; punishment, correction and incapacitation; prevention of crime.

CRIM 359. FIELD TRAINING IN CRIMINOLOGY AND CORRECTIONS. (1-3)
Prerequisites: SOCY 100; for crime control field training, CRIM 220 and CRIM 450. Enrollment restricted to available placements. Supervised field training in public and private social agencies. The student will select his particular area of interest and be responsible to any agency for a definite program of in-service training. Group meetings, individual conferences and written program reports will be a required part of the course.

CRIM 388. INDEPENDENT READING COURSE IN CRIMINOLOGY. (3)
H—HONORS
Prerequisite: SOCY 100. For honors students only. This course is designed for the needs of the honors students in criminology.

CRIM 389. INDEPENDENT RESEARCH IN CRIMINOLOGY. (3)
H—HONORS
Prerequisite: SOCY 100. For honors students only. This course is designed for the needs of the honors students in criminology.

CRIM 399. INDEPENDENT STUDY IN CRIMINOLOGY. (1-6)
Prerequisites: Written consent of faculty under whose direction the study is to be performed, and at least 12 hours of criminology credit. Integrated reading or research under direction and supervision of faculty member.

CRIM 450. JUVENILE DELINQUENCY. (3
Prerequisite: SOCY 100. Juvevnile delinquency in relation to the general problem of crime; analysis of factors underlying juvenile delinquency; treatment and prevention.

CRIM 451. CRIME AND DELINQUENCY PREVENTION. (3)
Prerequisites: CRIM 220 or CRIM 450 or consent of instructor. Methods and programs in prevention of crime and delinquency.

CRIM 452. TREATMENT OF CRIMINALS AND DELINQUENTS IN THE COMMUNITY. (3)
Prerequisites: CRIM 220 or CRIM 450 or consent of instructor. Analysis of the processes and methods in the modification of criminal patterns of behavior in a community setting.

CRIM 453. INSTITUTIONAL TREATMENT OF CRIMINALS AND DELINQUENTS. (3)
Prerequisites: CRIM 220 or CRIM 450 or consent of instructor. History, organization and functions of penal and correctional institutions for adults and juveniles.

CRIM 498. SELECTED TOPICS IN CRIMINOLOGY. (3)
Topics of special interest to advanced undergraduates in criminology. Such courses will be offered in response to student request and faculty interest. No more than six credits may be taken by a student in selected topics.

DANCE

DANC 100. DANCE TECHNIQUES. (2)
A study of dance movement in terms of placement, rhythm, dynamics, space, improvisation, and dance phrases.

DANC 102. RHYTHMIC INVENTION FOR DANCE. (2)
A course designed to show how rhythm affects the total dance movement picture and develops the dancer's rhythmic awareness and response. Understanding of rhythmic principles, movement isolation, design, phrasing, syncopation.

DANC 104. DANCE TECHNIQUES. (2)
Further development of the materials in DANC 1009. Prerequisite: DANC 100 or equivalent.

DANC 110. INTRODUCTORY EXPLORATION IN DANCE. (3)
Technique, improvisation, and theory of dance for beginning non-major students. Films, lectures. Hours in fine arts for the general education requirement.

DANC 199. WORKSHOP. (1-2)
Admission by consent of instructor. Planning, choreography and presentation of demonstrations and concerts. May be repeated for credit until 6 credits have been earned.

DANC 200. INTRODUCTION TO DANCE. (3)
Three lectures a week. A study of dance as a form of communication and as an art form. The course includes a survey of the theories and styles of dance, and of their relationships to other art forms. Lectures will be supplemented by observations, films, and guest speakers.

DANC 208. ELEMENTARY DANCE COMPOSITION. (3)
Prerequisite: DANC 104 or equivalent. The study of basic principles of dance composition in terms of space, time, dynamics, and movement invention. The development of critical awareness and judgment with regard to composing.

DANC 248. DANCE TECHNIQUES. (2)
A—Modern
B—Ballet
Prerequisite: DANC 104 or equivalent. A study of dance techniques and styles.

DANC 265. ELEMENTARY DANCE NOTATION. (3)
Prerequisite: DANC 102 or equivalent. Movement analysis for purposes of recording dance; notation fundamentals; elementary writing of technique; reading of simple folk, modern and ballet studies.

DANC 284. MOVEMENT FOR THE THEATRE. (3)
Lecture and laboratory. Prerequisite: One semester of dance technique. Movement for actors, dancers, directors, singers in theatre. Dynamics, qualities, styles, and space as related to movement on the stage.

DANC 305. DEVELOPMENT OF DANCE PROGRESSION. (3)
Prerequisite: DANC 208 or equivalent. The application and building of dance progression both in terms of dance techniques and in choreographic studies. Students have the opportunity to observe and assist the instructor in conducting lower-level dance classes.

DANC 348. DANCE TECHNIQUES. (2)
A—Modern
B—Ballet
C—Jazz
Further development of materials in DANC 248. Prerequisite: DANC 248 and 208 or equivalent.

DANC 365. INTERMEDIATE NOTATION. (3)
Prerequisite: DANC 265 or equivalent. Further development of materials in DANC 265, reading of scores, writing scores, performing from scores.

DANC 388. GROUP FORMS. (3)
Prerequisite: DANC 400 or equivalent. Choreography for small groups: duets, trios, quartets, etc.

DANC 389. DANCE TECHNIQUES. (2)
Prerequisite: DANC 348 or equivalent. Continuation of DANC 348 in further advanced form. May be repeated for credit.

DANC 400. ADVANCED CHOREOGRAPHIC FORMS. (3)
Prerequisite: DANC 208 or equivalent and adequate dance technique. Lectures and studio work in modern sources as they apply to dance. Solo and group choreography.

DANC 465. ADVANCED NOTATION. (3)
Prerequisite: DANC 365 or equivalent. Continuation of materials in DANC 365 in more intensive work. The translation, writing, and performing of advanced scores in the various forms of dance.

DANC 468. REPERTORY. (3)
The learning of dances to be chosen from notated scores, works of visiting artists, or selected faculty choreography to be performed on at least one concert. Audition required. The course may be repeated for credit, as different works will be chosen each semester.

DANC 470. CREATIVE DANCE FOR CHILDREN. (3)
Prerequisite: DANC 208 and 305 or equivalent. Directing the essential elements of dance to the level of the child's experience and facilitating the creative response. The development of movement into simple forms to serve as a symbol of individual expression.

DANC 478. DANCE PRODUCTION. (3)
Prerequisites: DANC 388 or equivalent and/or an adequate understanding of dance techniques. Advanced choreography. Independent work with periodic criticism.

DANC 482. HISTORY OF DANCE. (3)
The development of dance from primitive to contemporary times and the relationship of dance forms to patterns of culture.

DANC 483. HISTORY OF DANCE. (3)
The development of dance from primitive to the middle ages and the relationship of dance forms to patterns of culture.

DANC 484. THEORY AND PHILOSOPHY OF DANCE. (3)
The study of the theories, philosophies and aesthetics of dance. Investigation of form, content and structure. Interrelationships of the arts, and their role in man's world.

DANC 489. ETHNIC STYLES. (3)
Prerequisite: DANC 104. Lecture and activity in styles expressive of various cultures. May be repeated for credit by permission of instructor.

DANC 492. PERCUSSION AND MUSIC SOURCES FOR DANCE. (3)
Prerequisite: DANC 102 or equivalent. Techniques of percussion playing, and its use as dance accompaniment. Learning to use the instruments in composition and improvisation. Study of music sources for dance.

DANC 498. DIRECTED STUDIES IN DANCE. (1-6)
Hours arranged. For advanced students who have the permission of the chairman of the Department of Dance.

DANC 499. ADVANCED DANCE TECHNIQUE. (2)
Prerequisite: DANC 389 or equivalent. Continuation of DANC 389 or equivalent. Continuation of DANC 389 in further advanced form.

DRAMATIC ART

DART 110. INTRODUCTION TO THE THEATER. (3)
A general survey of the fields of the theatre.

DART 120. ACTING. (3)
Prerequisite: Consent of instructor. Basic principles of histrionic practice.

DART 170. STAGECRAFT. (3)
Fundamentals of technical production. Emphasis on construction of scenery.
A—For Dramatic Art Majors only.

DART 180. MAKE-UP. (2)
One lecture and one laboratory period a week. A lecture-laboratory course in the theory and practice of stage make-up, covering basic requirements as to age, type, character, race, and period.

DART 220. INTERMEDIATE ACTING. (3)
Prerequisite DART 120 and permission of instructor. Instruction, study, and practice in the science of blueprinting character development in a full length play for performance purposes.

DART 252. HISTORIC COSTUMING FOR THE STAGE. (3)
A study of costume for men and women from the ancient times to the present in relation to the artistic, social, economic and political influences of the times with particular emphasis on those periods which are most useful in theatrical production.

DART 253. COSTUME CRAFTS. (3)
The study of fabrics and garment construction and their application to the theatre techniques; included are pattern drafting, cutting, fitting and finishing.

DART 273. SCENOGRAPHIC TECHNIQUES. (3)
Prerequisite: DART 170. The translation of the artistic idea of the stage design into effectivve drawings for the execution of stage settings. Includes drafting for the stage, scene painting techniques, and practice in the mechanical visualization of scienic elements.

DART 311. PLAY PRODUCTION. (3)
Prerequisite: DART 110 or consent of instructor. Development of procedure followed by the director in preparing plays for public performance.

DART 314. THE FILM AS AN ART FORM. (3)
A study of the motion picture as a developing form of entertainment, communication, and artistic expression. A series of significant American and foreign films are viewed to illustrate the artistic, historical, and sociological trends of the twentieth century.

DART 330. PLAY DIRECTING. (3)
Prerequisite: DART 120 or consent of instructor. A lecture-laboratory course dealing with the fundamentals of script cutting, pacing, movement, blocking, and rehearsal routine as applied to the directing of plays.

DART 351. STAGE DECOR. (3)
Prerequisite: DART 214. A study of environmental decor and ornaments through the ages and its practical reproduction for a theatrical production.

DART 375. STAGE DESIGN. (3)
Prerequisite: DART 170 or consent of instructor. The theory of stage design and lighting. Making of plans as coordinate elements of scenic design.

DART 420. STYLES AND THEORIES OF ACTING. (3)
Prerequisite: DART 120 or consent of instructor. The study and application of historical styles and theories of acting.

DART 430. PLAY DIRECTING. (3)

DART 440. CHILDREN'S DRAMATICS. (3)
Principles and methods necessary for staging children's productions on the elementary school level. Major emphasis on creative dramatics; the application of creative dramatics in the school room, and the values gained by the child in this activity. Students will conduct classes in formal and creative dramatics which will culminate in children's programs.
A—For Dramatic Art Majors only.

DART 451. ADVANCED SCENIC DESIGN. (3)
Prerequisites: DART 330, 375, 475, 480, or permission of instructor. Design of stage settings, and of one total production. Study of stage design in the main historical periods and in contemporary theatre.

DART 476. PRINCIPLES AND THEORIES OF STAGE LIGHTING. (3)
Prerequisite: DART 375. A study of composition, control, and instrumentation in theatrical lighting.

DART 479. THEATER WORKSHOP. (3)
Prerequisite: DART 120 or 170. A laboratory course designed to provide the student with practical experience in all phases of theatre production.

DART 480. STAGE COSTUMING I. (3)
Prerequisite: DART 252. Basic principles of stage costuming.

DART 481. STAGE COSTUMING II. (3)
Prerequisite: DART 480. The advanced study of stage costuming through the development of style as a design consideration on theatrical productions. Designing costumes for various forms of drama, including period-styles.

DART 490. HISTORY OF THE THEATER. (3)
A survey of dramatic production from early origin to 1800.

DART 491. HISTORY OF THE THEATER. (3)
A survey of dramatic production from 1800 to the present.

DART 499. SEMINAR. (3)
Prerequisites: Senior standing and consent of instructor. Present-day drama research.

ECONOMICS

ECON 110. ECONOMIC DEVELOPMENTS. (3)
An introduction to modern economic institutions--their origins development and present status. Commercial revolution, industrial revolution and age of mass production. Emphasis on developments in England, Western Europe and the United States.

ECON 201. PRINCIPLES OF ECONOMICS. (3)
Prerequisite: Sophomore standing. Required in the Business Administration Curriculums. Basic concepts, the Monetary System, the National Accounts, National Income Analysis, and Business Cycles are introduced.

ECON 203. PRINCIPLES OF ECONOMICS. (3)
Prerequisite: Sophomore standing. Required in the Business Administration Curriculums. Emphasis is placed on Price Theory, Distribution, International Trade, and Economic Development.

ECON 205. FUNDAMENTALS OF ECONOMICS. (3)
Not open to students who have credit in ECON 201 and 203. Not open to B. P. A. students. A survey of the general principles underlying economic activity, analysis of leading economic problems in the modern world. This is the basic course in economics for students who are unable to take the more complete course provided in ECON 201 and 203.

ECON 395. HONORS SEMINAR. (3)
Normally taken in the junior year. Prerequisite: Candidacy for honors in economics. Selected topics are investigated an written reports are submitted.

ECON 396. INDEPENDENT HONORS STUDY. (3)
First semester. Normally taken in the senior year. Prerequisites: ECON 395 and candidacy for honors in Economics. Integrated reading under staff direction, leading to the preparation of a thesis in ECON 397.

ECON 397. HONORS THESIS. (3)
Second semester. Prerequisites: Economics 396 and candidacy for honors in economics. General supervision will be provided through assembled meetings with the professor in charge of the course.

ECON 398. TOPICS IN ECONOMICS. (3)
This course is designed to meet the changing interests of students and staff. Topics vary in response to those interests. This course may be repeated for credit when the subject matter changes. Students are advised to seek information about the coverage and prerequisites during the registration period. Repeatable to a maximum of six hours.

ECON 399. INDIVIDUAL READING AND RESEARCH FOR UNDERGRADUATES. (3)
By arrangement with individual instructors. This course is designed to meet the needs of students desiring specialized instruction and guidance in subjects not otherwise covered in the course offerings. A full program of reading, research and evaluation of performance should be worked out between the student and faculty member before enrollment. May be repeated to a maximum of six credits.

ECON 401. NATIONAL INCOME ANALYSIS. (3)
Prerequisite: ECON 203. Required for undergraduate Economics Majors. An analysis of National Income Accounts and the leveal of National Income and Employment.

ECON 402. BUSINESS CYCLES. (3)
First semester. Prerequisite: ECON 401. A study of the causes of depressions and unemployment, cyclical and secular instability, theories of business cycles, and the problem of controlling economic instability.

ECON 403. INTERMEDIATE PRICE THEORY. (3)
Prerequisite: ECON 203. Required for economics majors. An analysis of price and distribution theory with special attention to recent developments in the theory of imperfect competition.

ECON 407. CONTEMPORARY ECONOMIC THOUGHT. (3)
Prerequisites: ECON 203 and senior standing. Graduate students should take ECON 705. A survey of the development of economic thought since 1900 with special reference to Thorstein Veblen and other pre-1939 institutionalists and to post-1945 neoinstitutionalists such as J. K. Galbraith and Gunnar Myrdal.

ECON 411. AMERICAN ECONOMIC DEVELOPMENT. (3)
Prerequisites: ECON 203 or 205. Long-term trends in the American economy and analysis of the sources of output growth. Technological changes and the diffusion of new technologies. These subjects are discussed in the context of theoretical models.

ECON 415. INTRODUCTION TO ECONOMIC DEVELOPMENT OF UNDERDEVELOPED AREAS. (3)
Prerequisite: ECON 203 or 205. An analysis of the economic and social characteristics of underdeveloped areas. Recent theories of economic development, obstacles to development, policies and planning for development.

ECON 418. ECONOMIC DEVELOPMENT OF SELECTED AREAS. (3)
A—Latin America
B—Asia
C—Africa
Prerequisite: ECON 415. Institutional characteristics of a specific area are discussed and alternate strategies and policies for development are analyzed.

ECON 421. QUANTITATIVE METHODS IN ECONOMICS I. (3)
Prerequisites: ECON 201 and 203. Not open to students who have taken BSAD 230 or BSAD 231. An introduction to the use of statistics in economics. Topics include: probability, random variables and their distributions, sampling theory, estimation, hypothesis testing, analysis of variance, regression analysis, correlation.

ECON 422. QUANTITATIVE METHODS IN ECONOMICS II. (3)
Prerequisites: ECON 401, 403, 421, and ECON 425, or permission of instructor. Formulation, estimation and testing of economic models; theory of identification in linear models, multiple regression and analysis of variance; single-equation problems in econometric work and econometric methods in estimation of multi-equation structures. Examples of current research employing econometric methods.

ECON 425. MATHEMATICAL ECONOMICS. (3)
Prerequisites: ECON 401 and 403 and one year of col-

lege mathematics. A course designed to enable economics majors to understand the simpler aspects of mathematical economics. Those parts of the calculus and algebra required for economic analysis will be presented.

ECON 430. MONEY AND BANKING. (3)
Prerequisite: ECON 203. Relation of money and credit to economic activity and prices; impact of public policy in financial markets and in markets for goods and services; policies, structure, and functions of the Federal Reserve System; organization, operation, and functions of the commercial banking system, as related particularly to questions of economic stability and public policy.

ECON 431. THEORY OF MONEY, PRICES AND ECONOMIC ACTIVITY. (3)
Prerequisite: ECON 430. A theoretical treatment of the influence of money and financial markets on economic activity and prices, and of the effects of monetary policy on the markets for goods and services; the role of money in the classical and Keynesian macro-systems; topics of theoretical interest in monetary policy formation and implementation.

ECON 440. INTERNATIONAL ECONOMICS. (3)
Prerequisite: ECON 203. A descriptive and theoretical analysis of international trade, balance of payments accounts, the mechanism of international economic adjustment, comparative costs, economics of customs unions.

ECON 441. INTERNATIONAL ECONOMIC POLICIES (3)
Prerequisites: ECON 440, 401, and 403. Contemporary balance of payments problems; the international liquidity controversy investment, trade and economic development; evaluation of arguments for protection.

ECON 450. INTRODUCTION TO PUBLIC FINANCE (3)
Prerequisites: ECON 201 and 203 or 203 and 205. A study of the role of federal, state and local governments in mobilizing resources to meet public wants; principles and policies of taxation, debt management, and government expenditures and their effects on resource allocation, stabilization of income and prices, income distribution, and economic growth.

ECON 451. THEORY OF PUBLIC FINANCE. (3)
Prerequisites: ECON 450 and 401 or consent of instructor. An economic analysis of the theory and practice of public finance including taxation, debt management, expenditures, and fiscal policy.

ECON 454. STATE AND LOCAL PUBLIC FINANCE. (3)
Prerequisite: ECON 203 or 205. Principles and problems of governmental finance with special reference to state and local jurisdictions. Topics to be covered include taxation, expenditures and intergovernmental fiscal relations.

ECON 460. INDUSTRIAL ORGANIZATION. (3)
Prerequisite: ECON 203 or 205. Changing structure of the American economy; price policies in different industrial classifications of monopoly and competition in relation to problems of public policy.

ECON 461. ECONOMICS OF AMERICAN INDUSTRIES. (3)
Prerequisite: ECON 203 or 205. A study of the technology, economics and geography of representative American industries.

ECON 470. LABOR ECONOMICS. (3)
Prerequisite: ECON 203 or 205. The historical development and chief characteristics of the American labor movement are first surveyed. Present-day problems are then examined in detail: wage theories, unemployment, social security, labor organization, and collective bargaining.

ECON 471. CURRENT PROBLEMS IN LABOR ECONOMICS. (3)
Prerequisite: ECON 470. A detailed examination of current problems in labor economics including: labor market and manpower problems, unemployment compensation and social security, wage theories, and productivity analysis.

ECON 475. ECONOMICS OF POVERTY AND DISCRIMINATION. (3)
Prerequisite: ECON 203 or 205. Topics include the causes of the persistence of low income groups; the relation of poverty to technological change, to economic growth, and to education and training; economic motivations for discrimination; the economic results of discrimination; proposed remedies for poverty and discrimination.

ECON 480. COMPARATIVE ECONOMIC SYSTEMS. (3)
Prerequisite: ECON 203 or 205. An investigation of the theory and practice of various types of economic systems. An examination and evaluation of the capitalistic system followed by an analysis of alternative types of economic systems such as fascism, socialism and communism.

ECON 482. ECONOMICS OF THE SOVIET UNION. (3)
Prerequisite: ECON 203 or 205. An analysis of the organization, operating principles and performance of the Soviet economy with attention to the historical and ideological background, planning, resources, industry, agriculture, domestic and foreign trade, finance, labor, and the structure and growth of national income.

ECON 484. THE ECONOMY OF CHINA. (3)
Prerequisite: ECON 203 or 205. Policies and performances of the Chinese economy since 1949. Will begin with a survey of modern China's economic history. Emphasizes the strategies and institutional innovations that the Chinese have adopted to overcome the problems of economic development. Some economic controversies raised during the 'Cultural Revolution' will be covered in review of the problems and prospects of the present Chinese economy.

ECON 486. THE ECONOMICS OF NATIONAL PLANNING. (3)
Prerequisite: ECON 203 or 205. An analysis of the principles and practice of economic planning with special reference to the planning problems of West European countries and the United States.

ECON 490. SURVEY OF URBAN ECONOMIC PROBLEMS AND POLICIES. (3)
Prerequisites: ECON 201, 203 or ECON 205. An introduction to the study of urban economics through the examination of current policy issues. Topics may include suburbanization of jobs and residences, housing and urban renewal, urban transportation, development of New Towns, ghetto economic development, problems in services such as education and police.

ECON 491. REGIONAL AND URBAN ECONOMICS. (3)
Prerequisite: ECON 401, or consent of the instructor. Study of the theories, problems and policies of urban and regional economic development.

EDUCATION ADMINISTRATION, SUPERVISION, AND CURRICULUM

EDAD 489. FIELD EXPERIENCE IN EDUCATION. (1-4)
A—ADULT EDUCATION
B—FOUNDATIONS
C—HIGHER EDUCATION
Prerequisites: At least six semester hours in education at the University of Maryland plus such other prerequisites as may be set by the major area in which the experience is to be taken. Planned field experience may be provided for selected students who have had teaching experience and whose application for such field experience has been approved by the education faculty. Field experience is offered in a given area to both major and nonmajor students.
NOTE—The total number of credits which a student may earn in EDAD 489, 888, and 889 is limited to a maximum of 20 semester hours.

EDAD 498. SPECIAL PROBLEMS IN EDUCATION. (1-3)
Prerequisite: Consent of instructor. Available only to advanced students who have definite plans for individual study of approved problems. Course cards must have the title of the problem and the name of the faculty member who has approved it.

EDAD 499. WORKSHOPS, CLINICS, INSTITUTES. (1-6)
The maximum number of credits that may be earned under this course symbol toward any degree is six semester hours; the symbol may be used two or more times until six semester hours have been reached the following type of educational enterprise may be scheduled under this course heading: Workshops conducted by the college of education (or developed cooperatively with other colleges and universities) and not otherwise covered in the present course listing; clinical experiences in pupil-testing centers, reading clinics, speech therapy laboratories, and special education centers; institutes developed around specific topics or problems and intended for designated groups such as school superintendents, principals and supervisors.

EDUCATION COUNSELING AND PERSONNEL SERVICES

EDCP 410. INTRODUCTION TO COUNSELING AND PERSONNEL SERVICES. (3)
Presents principles and procedures, and examines the functions of counselors, psychologists in schools, school social workers, and other personnel service workers.

EDCP 411. MENTAL HYGIENE. (3)
The practical application of the principles of mental hygiene to classroom problems.

EDCP 460. INTRODUCTION TO REHABILITATION COUNSELING. (3)
Introductory course for majors in rehabilitation counseling, social work, psychology, or education who desire to work professionally with physically or emotionally handicapped persons.

EDCP 470. INTRODUCTION TO STUDENT PERSONNEL. (3)
Prerequisite: Consent of instructor. A systematic analysis of research and theoretical literature on a variety of major problems in the organization and administration of student personnel services in higher education. Included will be discussion of such topics as the student personnel philosophy in education, counseling services, discipline, housing, student activities, financial aid, health, remedial services, etc.

EDCP 489. FIELD EXPERIENCE IN COUNSELING AND PERSONNEL SERVICES. (1-4)
Planned field experience for selected major students.

EDCP 498. SPECIAL PROBLEMS IN COUNSELING AND PERSONNEL SERVICES. (1-3)
Prerequisite: Consent of instructor. Available only to major students who have formal plans for individual study of approved problems. Course cards must have the title of the problem and the name of the faculty member who has approved it.

EDCP 499. WORKSHOPS, CLINICS, INSTITUTES. (1-6)
The maximum number of credits that may be earned under this course symbol toward any degree is six semester hours; the symbol may be used two or more times until six semester hours have been reached. The following type of educational enterprise may be scheduled under this course heading: Workshops conducted by the department of counseling and personnel services (or developed cooperatively with other departments, colleges and universities) and not otherwise covered in the present course listing: clinical experiences in counseling and testing centers, reading clinics, speech therapy laboratories, and special education centers; institutes developed around specific topics or problems and intended for designated groups.

EDUCATION, EARLY CHILDHOOD-ELEMENTARY

EDEL 288. SPECIAL PROBLEMS IN EDUCATION (1-6)
Prerequisites: Consent of Education advisor. Available only to freshmen and sophomore students who have definite plans for individual study of approved problems relative to their preparation for teaching. Course cards must have the title of the problem and the name of the faculty member who has approved it.

EDEL 301. SCIENCE IN EARLY CHILDHOOD EDUCATION. (2)

EDEL 302. SCIENCE IN THE ELEMENTARY SCHOOL. (2)
Designed to help teachers acquire general science understandings and to develop teaching materials for practical use in classrooms. Includes experiments, demonstrations, constructions, observations, field trips and use of audio-visual materials. The emphasis is on content and method related to science units in common use in elementary schools.

EDEL 303. ACTIVITIES AND MATERIALS IN EARLY CHILDHOOD EDUCATION. (3)
Prerequisite: EDUC 300 (or concurrent enrollment). Storytelling, selection of books, the use, preparation and presentation of such raw materials as clay, paints (easel and finger), blocks, wood, and scrap materials.

EDEL 304. LANGUAGE ARTS IN EARLY CHILDHOOD EDUCATION. (2)
Teaching of spelling, handwriting, oral and written expression, and creative expression.

EDEL 305. LANGUAGE ARTS IN THE ELEMENTARY SCHOOL. (2)

EDEL 306. SOCIAL STUDIES IN EARLY CHILDHOOD EDUCATION. (2)

EDEL 307. SOCIAL STUDIES IN THE ELEMENTARY SCHOOL. (2)
Consideration given to curriculum, organization and methods of teaching, evaluation of newer materials, and utilization of environmental resources.

EDEL 310. THE CHILD AND THE CURRICULUM—EARLY CHILDHOOD. (2)

EDEL 311. THE CHILD AND THE CURRICULUM—ELEMENTARY. (2)
Relationship of the elementary school curriculum to child growth and development. Recent trends in curriculum organization; the effect of environment on learning; readiness to learn; and adapting curriculum content and methods to maturity levels of children.

EDEL 312. ART IN THE ELEMENTARY SCHOOL. (2)
Concerned with art methods and materials for elementary schools. Includes laboratory experiences with materials appropriate for elementary schools.

EDEL 313. MATHEMATICS IN EARLY CHILDHOOD EDUCATION. (2)

EDEL 314. MATHEMATICS IN THE ELEMENTARY SCHOOL. (2)
Emphasis on materials and procedures which help pupils sense arithmetical meanings and relationships. Helps teachers gain a better understanding of the number system and arithmetical processes.

EDEL 315. TEACHING IN NURSERY SCHOOL AND KINDERGARTEN. (3)
An overview of nursery school and kindergarten teaching designed for individuals without specific preparation for elementary school teaching or for individuals without recent teaching experience.

EDEL 316. TEACHING IN THE ELEMENTARY SCHOOL. (3)
An overview of elementary school teaching for individuals without recent teaching experience.

EDEL 320. CURRICULUM AND INSTRUCTION—COOPERATIVE NURSERY SCHOOL. (3)
Philosophy of early childhood education, observation of the developmental needs at various age levels, with em-

phasis upon the activities, materials and methods by which educational objectives are attained.

EDEL 321. CURRICULUM AND INSTRUCTION—EARLY CHILDHOOD. (3)

EDEL 322. CURRICULUM AND INSTRUCTION—ELEMENTARY. (3)
Philosophy of elementary education, observation of the developmental needs at various age levels, with emphasis upon the activities, materials and methods by which educational objectives are attained

EDEL 323. FOREIGN LANGUAGE METHODS IN THE ELEMENTARY SCHOOL. (3)
Registration limited and based upon approval of advisor. Methods and techniques for developmental approach to the teaching of modern foreign languages in elementary schools. Use of real development of oral-aural skills and understanding of young children in language development are stressed.

EDEL 324. LITERATURE FOR CHILDREN AND YOUNG PEOPLE. (3)
Development of literary materials for children and young people. Timeless and ageless books, and outstanding examples of contemporary publishing. Evaluation of the contributions of individual authors and illustrators and children's book awards.

EDEL 325. THE TEACHING OF READING—EARLY CHILDHOOD. (2)
Concerned with the fundamentals of developmental reading instruction, including reading readiness, use of experience stories, procedures in using basal readers, the improvement of comprehension, teaching reading in all areas of the curriculum, uses of children's literature, the program in word analysis, and procedures for determining individual needs.

EDEL 326. THE TEACHING OF READING—ELEMENTARY. (2)
Concerned with the fundamentals of developmental reading instruction, including readiness, use of experience records, procedures in using basal readers, the improvement of comprehension, teaching reading in all areas of the curriculum, uses of children's literature, the program in word analysis, and procedures for determining individual needs.

EDEL 330 to 336—STUDENT TEACHING COURSES.

Student teaching is a full time commitment. Consequently, interference with this commitment due to employment is not permitted.

Transportation to the school(s) assigned for student teaching is the responsibility of each student.

Student teachers in elementary, early childhood, special education and library science should reserve the week of registration for orientation in public schools. A doctor's certificate indicating freedom from communicable diseases and approval of the instructor required. Undergraduate credit only. No other courses may be taken during a full semester of student teaching. For 16 credits, full time for one semester is devoted to this work. For experienced teachers the time and credit may be reduced to not less than 8 credits.

EDEL 330. STUDENT TEACHING IN THE NURSERY SCHOOL. (4)

EDEL 331. STUDENT TEACHING IN KINDERGARTEN. (4)

EDEL 332. STUDENT TEACHING IN PRIMARY. (8)

EDEL 333. STUDENT TEACHING IN ELEMENTARY. (8-16)

EDEL 334. STUDENT TEACHING IN LIBRARY SCIENCE. (4)

EDEL 335. STUDENT TEACHING IN MUSIC. (4-6)

EDEL 336. STUDENT TEACHING IN PHYSICAL EDUCATION. (4-8)

EDEL 401. SCIENCE IN EARLY CHILDHOOD EDUCATION. (3)

EDEL 402. SCIENCE IN THE ELEMENTARY SCHOOL. (3)
Designed to help teachers acquire general science understandings and to develop teaching materials for practical use in classrooms. Includes experiments, demonstrations, constructions, observations, field trips and use of audio-visual materials. The emphasis is on content and method related to science units in common use in elementary schools.

EDEL 404 LANGUAGE ARTS IN EARLY CHILDHOOD EDUCATION. (3)
Teaching of spelling, handwriting, oral and written expression, and creative expression.

EDEL 405. LANGUAGE ARTS IN THE ELEMENTARY SCHOOL. (3)

EDEL 406. SOCIAL STUDIES IN EARLY CHILDHOOD EDUCATION. (3)

EDEL 407. SOCIAL STUDIES IN THE ELEMENTARY SCHOOL. (3)
Consideration given to curriculum, organization and methods of teaching, evaluation of newer materials, and utilization of environmental resources.

EDEL 410. THE CHILD AND THE CURRICULUM—EARLY CHILDHOOD. (3)

EDEL 411. THE CHILD AND THE CURRICULUM—ELEMENTARY. (3)
Relationship of the elementary school curriculum to child growth and development. Recent trends in curriculum organization; the effect of environment on learning; readiness to learn; adapting curriculum content and methods to maturity levels of children.

EDEL 412. ART IN THE ELEMENTARY SCHOOL. (3)
Concerned with art methods and materials for elementary schools. Includes laboratory experiences with materials appropriate for elementary schools.

EDEL 413. MATHEMATICS IN EARLY CHILDHOOD EDUCATION. (3)

EDEL 414. MATHEMATICS IN THE ELEMENTARY SCHOOL. (3)
Emphasis on materials and procedures which help pupils sense arithmetical meanings and relationships. Helps teachers gain a better understanding of the number system and arithmetical processes.

EDEL 424. LITERATURE FOR CHILDREN AND YOUNG PEOPLE, ADVANCED. (3)
Development of literary materials for children and young people. Timeless and ageless books, and outstanding examples of contemporary publishing. Evaluation of the contributions of individual authors and illustrators and children's book awards.

EDEL 425. THE TEACHING OF READING—EARLY CHILDHOOD. (3)
Concerned with the fundamentals of developmental reading instruction, including readiness, use of experience records, procedures in using basal readers, the improvement of comprehension, teaching reading in all areas of the curriculum, uses of children's literature, the program in word analysis, and procedures for determining individual needs.

EDEL 426. THE TEACHING OF READING—ELEMENTARY. (3)
Concerned with the fundamentals of developmental reading instruction, including readiness, use of experience records, procedures in using basal readers, the improvement of comprehension, teaching reading in all areas of the curriculum, uses of children's literature, the program in word analysis, and procedures for determining individual needs.

EDEL 430. CORRECTIVE—REMEDIAL READING INSTRUCTION. (3)
Prerequisite: EDEL 326 or equivalent. For teachers, supervisors, and administrators who wish to identify and assist pupils with reading difficulties. Concerned with

diagnostic techniques, instructional materials and teaching procedures useful in the regular classroom.

EDEL 431. LABORATORY PRACTICES IN READING. (3)
Prerequisite: EDEL 430. A laboratory course in which each student has one or more pupils for analysis and instruction. At least one class meeting per week to diagnose individual cases and to plan instruction.

EDEL 489. FIELD EXPERIENCE IN EDUCATION. (1-4)
Prerequisites: At least six semester hours in education at the University of Maryland plus such other prerequisites as may be set by the major area in which the experience is to be taken. Planned field experience may be provided for selected students who have had teaching experience and whose application for such field experience has been approved by the education faculty. Field experience is offered in a given area to both major and nonmajor students.
NOTE—The total number of credits which a student may earn in EDEL 489, 888, and 889 is limited to a maximum of 20 semester hours.

EDEL 498. SPECIAL PROBLEMS IN EDUCATION. (1-3)
Prerequisite: Consent of instructor. Available only to mature students who have definite plans for individual study of approved problems. Course cards must have the title of the problem and the name of the faculty member who has approved it.

EDEL 499. WORKSHOPS, CLINICS, AND INSTITUTES. (1-6)
The maximum number of credits that may be earned under this course symbol toward any degree is six semester hours; the symbol may be used two or more times until six semester hours have been reached. The following types of educational enterprise may be scheduled under this course heading: workshops conducted by the college of education (or developed cooperatively with other colleges and universities) and not otherwise covered in the present course listing; clinical experiences in pupil-testing centers, reading clinics, speech therapy laboratories, and special education centers; institutes developed around specific topics or problems and intended for designated groups such as school superintendents, principals and supervisors.

EDUCATION, HUMAN DEVELOPMENT

EDHD 306. A STUDY OF HUMAN BEHAVIOR. (3)
This course is planned for and limited to students who are not enrolled in the College of Education, and it does not satisfy the requirements of the professional teacher education programs. The course is designed to introduce students to the scientific principles (physical, social and psychological) which describe human behavior, development and adjustment at all maturity levels and to use these principles in the study of individual children and youth. Each student will observe, record, and analyze the behavior of an individual throughout the semester and must have one half-day a week for this purpose.

EDHD 312. SCIENTIFIC CONCEPTS IN HUMAN DEVELOPMENT I. (3)

EDHD 313. LABORATORY IN BEHAVIOR ANALYSIS I. (3)

EDHD 314. SCIENTIFIC CONCEPTS IN HUMAN DEVELOPMENT II. (3)

EDHD 315. LABORATORY IN BEHAVIOR ANALYSIS II: (3)

EDHD 402. CHILD DEVELOPMENT LABORATORY I. (2)
This course involves the direct study of children throughout the school year. Each participant gathers a wide body of information about an individual, presents the accumulating data from time to time to the study group for criticism and group analysis and writes an interpretation of the dynamics underlying the child's learning behavior and development. Provides opportunity for teachers in service to earn credit for participation in their own local child study group.

EDHD 403. CHILD DEVELOPMENT LABORATORY II. (2)
This course involves the direct study of children throughout the school year. Each participant gathers a wide body of information about an individual, presents the accumulating data from time to time to the study group for criticism and group analysis and writes an interpretation of the dynamics underlying the child's learning behavior and development. Provides opportunity for teachers in service to earn credit for participation in their own local child study group.

EDHD 404. CHILD DEVELOPMENT LABORATORY III. (2)
This course involves the direct study of children throughout the school year. Each participant gathers a wide body of information about an individual, presents the accumulating data from time to time to the study group for criticism and group analysis and writes an interpretation of the dynamics underlying the child's learning behavior and development. Provides opportunity for teachers in service to earn credit for participation in their own local child study group.

EDHD 411. CHILD GROWTH AND DEVELOPMENT. (3)
Growth and development of the child from conception through the early childhood years, with emphasis on development sequences in physical, psychological and social areas. Implications for understanding and working with young children in the home, school, and in other settings.

EDHD 413. ADOLESCENT DEVELOPMENT. (3)
A study of the interplay of physical, cultural and self forces as they influence behavior, development, learning, and adjustment during adolescence. Includes observation and case study. This course cannot be used to meet the psychological foundations requirements for teacher certification.

EDHD 416. SCIENTIFIC CONCEPTS IN HUMAN DEVELOPMENT III. (3)
Guided reading and observation of pupils throughout the school year. Emphasis on human development concepts relating to impact of family, school, society, and peer group on the student. Collection and analysis of data affecting learning and behavior. For in-service Educators. (Not open to persons with credit in EDHD 402, 403).

EDHD 417. LABORATORY IN BEHAVIOR ANALYSIS III. (3)
Prerequisite: EDHD 416. Guided reading and observation of pupils throughout the school year. Emphasis on analysis of intrinsic aspects of learning and behavior including cognitive processes, motivation, self-concept, attitudes, and values. For in-service educators. (Not open to persons with credit on EDHD 402, 403).

EDHD 420. STUDY OF HUMAN DEVELOPMENT AND LEARNING IN SCHOOL SETTINGS I. (2)
Enables in-service teachers and administrators to carry on advance study of human development and learning principles in the continuous study and evaluation of several different phases of the school program over an extended period of time.

EDHD 421. STUDY OF HUMAN DEVELOPMENT AND LEARNING IN SCHOOL SETTINGS II. (2)
Enables in-service teachers and administrators to carry on advanced study of human development and learning principles in the continuous study and evaluation of several different phases of the school program over an extended period of time.

EDHD 422. STUDY OF HUMAN DEVELOPMENT AND LEARNING IN SCHOOL SETTINGS III. (2)
Enables in-service teachers and administrators to carry on advanced study of human development and learning principles in the continuous study and evaluation of several different phases of the school program over an extended period of time.

EDHD 445. GUIDANCE OF YOUNG CHILDREN. (3)
Development of an appreciation and understanding of young children from different home and community backgrounds; study of individual and group problems.

EDHD 460. EDUCATIONAL PSYCHOLOGY (3)
Prerequisites: PSYC 100 or EDUC 300 or equivalent.

Offers an examination of research and problems in educational psychology. Includes consideration of measurement and the significance of individual differences, learning, motivation and emotions, transfer of learning, intelligence, attitudes, problem solving; understanding and thinking, and communicating knowledge. The course is intended to provide an overview of educational psychology with an emphasis on learning processes. It may not be substituted for EDUC 300 by regularly matriculated students in the teacher education program.

EDHD 489. FIELD EXPERIENCES IN EDUCATION. (1-4)
A—ADULT EDUCATION
B—FOUNDATIONS
C—HIGHER EDUCATION
Prerequisites: At least six semester hours in education at the University of Maryland plus such other prerequisites as may be set by the major area in which the experience is to be taken. Planned field experience may be provided for selected students who have had teaching experience and whose application for such field experience has been approved by the education faculty. Field experience is offered in a given area to both major and nonmajor students.
NOTE:—The total number of credits which a student may earn in EDHD 489, 888, and 889 is limited to a maximum of 20 semester hours.

EDHD 498. SPECIAL PROBLEMS IN EDUCATION. (1-3)
Prerequisite: Consent of instructor. Available only to mature students who have definite plans for individual study of approved problems. Course cards must have the title of the problem and the name of the faculty member who has approved it.

EDHD 499. WORKSHOPS, CLINICS, AND INSTITUTES. (1-6)
The maximum number of credits that may be earned under this course symbol toward any degree is six semester hours; the symbol may be used two or more times until six semester hours have been reached. The following type of educational enterprise may be scheduled under this course heading: Workshops conducted by the college of education (or developed cooperatively with other colleges and universities) and not otherwise covered in the present course listing; clinical experiences in pupil-testing centers, reading clinics, speech therapy laboratories, and special education centers; institutes developed around specific topics or problems and intended for designated groups such as school superintendents, principals and supervisors.

EDUCATION, INDUSTRIAL

EDIN 101. MECHANICAL DRAWING I. (2)
Four hours of laboratory per week. This course constitutes an introduction to orthographic multi-view and isometric projection. Emphasis is placed upon the visualization of an object when it is represented by a multi-view drawing and upon the making of multi-view drawings. The course carries through auxiliary views, sectional views, dimensioning, conventional representation and single stroke letters.

EDIN 102. WOODWORKING I. (3)
Six hours of laboratory per week. The course is designed to give the student an orientation into the woodworking industry with regard to materials, products and processes while providing for skill development in the care and use of hand and power tools.

EDIN 106. INDUSTRIAL ARTS IN THE ELEMENTARY SCHOOL I. (2)
Four hours of laboratory per week. A course for preservice and in-service elementary school teachers covering construction activities in a variety of media suitable for classroom use. The work is organized on the unit basis so that the construction aspect is supplemented by reading and other investigative procedures.

EDIN 106A. INDUSTRIAL ARTS IN THE ELEMENTARY SCHOOL II. (2)
Prerequisite. EDIN 106. This is a continuation of EDIN 106. Four hours of laboratory per week. It provides the teacher with opportunities to develop further competence in construction activities. Some of the basic phenomena of industry are studied, particularly those which apply to the manufacture of common products, housing, transportation and communication.

EDIN 112. SHOP CALCULATIONS. (3)
Shop Calculations is designed to develop an understanding and working knowledge of the mathematical concepts related to the various aspects of industrial education. The course includes phases of algebra, geometry, trigonometry, and general mathematics as applied to shop and drawing activities.

EDIN 121. MECHANICAL DRAWING II. (2)
Four hours of laboratory per week. Prerequisite: EDIN 101. A course dealing with working drawings, machine design, pattern layouts, tracing and reproduction. Detail drawings followed by assemblies are presented.

EDIN 122. WOODWORKING II. (3)
Six hours of laboratory per week. Prerequisite: EDIN 102, for industrial arts teacher education majors. The course is designed to give the student a comprehensive knowledge of machine production with emphasis on safety, industrial processes and maintenance.

EDIN 124. SHEET METAL WORK. (2)
Four hours of laboratory per week. Articles are made from metal in its sheet form and involve the operations of cutting, shaping, soldering, riveting, wiring, folding, seaming, beading, burning, etc. The student is required to develop his own patterns inclusive of parallel line development radial line development, and triangulation.

EDIN 127. ELECTRICITY—ELECTRONICS I. (3)
Six hours of laboratory per week. An introductory course to electricity-electronics in general, dealing with electrical circuits and wiring, the measurement of electrical energy, the theory of motors and generators and an introduction to vacuum tubes, transistors and power supplies.

EDIN 133. AUTOMOTIVES I. (3)
Six hours of laboratory per week. Automotives I is a study of the fundamentals of internal combustion engines as applied to transportation. A study of basic materials and methods used in the transportation industry is included.

EDIN 134. GRAPHIC ARTS I. (3)
Six hours of laboratory per week. An introductory course involving experiences in letterpress and offset printing practices. This course includes typographical design, hand composition, proof reading, stock preparation, offset plate making, imposition, lock-up, presswork, linoleum block cutting, paper marbelizing, and bookbinding.

EDIN 184. ORGANIZED AND SUPERVISED WORK EXPERIENCES. (3)
(3 credits for each internship period, total: 6 credits). This is a work experience sequence planned for students enrolled in the curriculum, 'Education For Industry'. The purpose is to provide the students with opportunities for first-hand experiences with business and industry. The student is responsible for obtaining his own employment with the coordinator advising him in regard to the job opportunities which have optimum learning value. The nature of the work experience desired is outlined at the outset of employment and then evaluations made by the student and the coordinator are based upon the planned experiences. The minimum time basis for each internship is 6 forty-hour weeks or 240 work hours. Any one period of internship must be served through continuous employment in a single establishment.

EDIN 201. OPERATIONAL DRAWING. (2)
Four hours of laboratory per week. Prerequisite: EDIN 101, or equivalent. A comprehensive course designed to

give students practice in the modern drafting methods of industry.

EDIN 210. FOUNDRY. (1)
Two hours of laboratory per week. Bench and floor molding and elementary core making. Theory and principles covering foundry materials, tools and appliances.

EDIN 223. ARC AND GAS WELDING. (1)
Two hours of laboratory per week. A course designed to develop a functional knowledge of the principles and use of electric and acetylene welding. Practical work is carried on in the construction of various projects using welded joints. Instruction is given in the use and care of equipment, types of welded joints, methods of welding, importance of welding processes in industry, safety consideration, etc.

EDIN 226. GENERAL METAL WORK. (3)
Six hours of laboratory per week. This course provides experiences in constructing items from aluminum, brass, copper, pewter, and steel. The processes included are designing, layout, heat treating, forming, surface decorating, fastening, and assembling. The course also includes a study of the aluminum, copper, and steel industries in terms of their basic manufacturing processes.

EDIN 231. MECHANICAL DRAWING. (2)
Four hours of laboratory per week. Prerequisites: EDIN 101 and 121. A course dealing with the topics enumerated in EDIN 121 but on a more advanced basis. The reading of prints representative of a variety of industries is a part of this course.

EDIN 241. ARCHITECTURAL DRAWING. (2)
Four hours of laboratory per week. Prerequisites: EDIN 101 or equivalent. Practical experience is provided in the design and planning of houses and other buildings. Working drawings, specifications, and blue-prints are featured.

EDIN 242. WOODWORKING III. (3)
Six hours of laboratory per week. Prerequisite: EDIN 122. The course is designed to give the student a comprehensive knowledge of contemporary woodworking technology with emphasis on mass production techniques, industrial research, and materials tests.

EDIN 243. AUTOMOTIVES II. (3)
Six hours of laboratory per week. Prerequisite: EDIN 133. This is an advanced course in transportation and power generation covering engines, fuel systems, ignition systems, and power trains.

EDIN 244. GRAPHIC ARTS II. (3)
Six hours of laboratory per week. Prerequisite: EDIN 134. An advanced course designed to provide further experiences to letterpress and offset printing and to introduce other reproduction processes. Silk screen printing, dry print etching, mimeograph reproduction, and rubber stamp making are the new processes introduced in this course.

EDIN 247. ELECTRICITY—ELECTRONICS II. (3)
Six hours of laboratory per week. Prerequisite: EDIN 127 or equivalent. An intermediate course designed to provide more extensive knowledge in electricity-electronics including the principles of the transmission and reception of radio waves, the applications of transistors and other semiconductors and an introduction to industrial electronics.

EDIN 262. MACHINE SHOP PRACTICE I. (3)
Six hours of laboratory per week. Prerequisite: EDIN 101, or equivalent. Bench work, turning, planing, milling, and drilling. Related technical information.

EDIN 282. MACHINE SHOP PRACTICE II. (3)
Four hours of laboratory per week. Prerequisite: EDIN 262, or equivalent. Advanced shop practicum in thread cutting, grinding, boring, reaming and gear cutting. Work-production methods are employed.

EDIN 288. SPECIAL PROBLEMS IN EDUCATION. (1-6)
Prerequisites: Consent of education advisor. Available only to freshmen and sophomore students who have definite plans for individual study of approved problems relative to their preparation for teaching. Course cards must have the title of the problem and the name of the faculty member who has approved it.

EDIN 305. GENERAL SHOP. (3)
Designed to meet needs in organizing and administering a secondary school shop. Students are rotated through skill and knowledge developing activities in a variety of shop areas.

EDIN 307. ELECTRICITY—ELECTRONICS III. (3)
Six hours of laboratory per week. Prerequisite: EDIN 127, or equivalent. An advanced course designed to provide more extensive knowledge in electricity or electronics including the advanced theory and applications of semiconductors and the principles of the storage and transmission of electronically coded information.

EDIN 311. LABORATORY PRACTICUM IN INDUSTRIAL ARTS EDUCATION. (3)
Six hours of laboratory per week. Prerequisite: 18 semester hours of shopwork and drawing. A course devoted to the development of instructional materials and the refinement of instructional methods pertinent to the teaching of industrial arts at the secondary school level.

EDIN 324. ORGANIZED AND SUPERVISED WORK EXPERIENCES. (3)
(3 credits for each internship period, total: 6 credits.) This is a work experience sequence planned for students enrolled in the curriculum, "Education for Industry." The purpose is to provide the students with opportunities for first-hand experiences with business and industry. The student is responsible for obtaining his own employment with the coordinator advising him in regard to the job opportunities which have optimum learning value. The nature of the work experience desired is outlined at the outset of employment and then evaluations made by the student and the coordinator are based upon the planned experiences. The minimum time basis for each internship is 6 forty-hour weeks or 240 work hours. Any one period of internship must be served through continuous employment in a single establishment.

EDIN 340. CURRICULUM, INSTRUCTION, AND OBSERVATION. (3)
Major functions and specific contributions of industrial art education; its relation to the general objectives of the junior and senior high schools, selection and organization of subject matter in terms of modern practices and needs; methods of instruction; expected outcomes; measuring results; professional standards. Twenty periods of observation.

EDIN 347. STUDENT TEACHING IN THE SECONDARY SCHOOLS. (2-8)
Admission to student teaching requires a doctor's certificate indicating freedom from communicable diseases; the consent of the coordinating instructor; and previous enrollment at the University of Maryland for at least one semester. Undergraduate credit only. Application forms for this course must be submitted to the appropriate advisor by the middle of the semester preceding the one in which an assignment is desired. Students who register for this course serve as apprentice teachers in the schools to which they are assigned. For 8 credits, full time for one-half of the semester is devoted to this work. For experienced teachers who are planning to split student teaching assignment in elementary and secondary schools, the time and credit may be modified. Student teaching is a full-time commitment. Consequently, interference with this commitment due to employment is not permitted. Transportation to the school(s) assigned for student teaching is the responsibility of the student.

EDIN 350. METHODS OF TEACHING. (3)
(Offered at University College centers.) For vocational

and occupational teachers of shop work and related subjects. The identification and analysis of factors essential to helping others learn; types of teaching situations and techniques; measuring results and grading student progress in shop and related technical subjects.

EDIN 357. TESTS AND MEASUREMENTS. (3)
The construction of objective tests for occupational and vocational subjects.

EDIN 399. TRADE COMPETENCE. (1-20)
An examination to determine and evaluate the trade competence of students pursuing a degree in the field of vocational-industrial education.

EDIN 409. EXPERIMENTAL ELECTRICITY AND ELECTRONICS. (2)

EDIN 415. RESEARCH AND EXPERIMENTATION IN INDUSTRIAL ARTS. (3)
This is a laboratory-seminar course designed to develop persons capable of planning, directing and evaluating effective research and experimentation procedures with the materials, products and processes of industry.

EDIN 421. INDUSTRIAL ARTS IN SPECIAL EDUCATION. (3)
Four hours laboratory per week, one hour lecture. Prerequisite: EDSP 470 and 471 or consent of instructor. This course provides experiences of a technical and theoretical nature in industrial processes applicable for classroom use. Emphasis is placed on individual research in the specific area of one major interest in special education.

EDIN 425. INDUSTRIAL TRAINING IN INDUSTRY I. (3)
This course is designed to provide an overview of the function of industrial training, type of programs, organization, development and evaluation.

EDIN 426. INDUSTRIAL TRAINING IN INDUSTRY II. (3)
This course is designed to study specific training programs in a variety of industries, plant program visitation, training, program development, and analysis of industrial training research. Prerequisite: EDIN 425.

EDIN 443. INDUSTRIAL SAFETY EDUCATION I. (2)
This course deals briefly with the history and development of effective safety programs in modern industry and treats causes, effects and values of industrial safety education inclusive of fire prevention and hazard controls.

EDIN 444. INDUSTRIAL SAFETY EDUCATION II. (2)
In this course exemplary safety practices are studied through conference discussions, group demonstration, and organized plant visits to selected industrial situations. Methods of fire precautions and safety practices are emphasized. Evaluative criteria in safety programs are formulated.

EDIN 450. TRAINING AIDS DEVELOPMENT. (3)
Study of the aids in common use as to their source and application. Special emphasis is placed on principles to be observed in making aids useful to laboratory teachers. Actual construction and application of such devices will be required.

EDIN 457. TESTS AND MEASUREMENTS. (3)
The construction of objective tests for occupational and vocational subjects.

EDIN 460. ESSENTIALS OF DESIGN. (2)
Two laboratory periods a week. Prerequisite: EDIN 101 and basic laboratory work. A study of the basic principles of design and practice in their application to the construction of laboratory projects.

EDIN 461. PRINCIPLES OF VOCATIONAL GUIDANCE. (3)
This course identifies and applies the underlying principles of guidance to the problems of educational and vocational adjustment of students.

EDIN 462. OCCUPATIONAL ANALYSIS AND COURSE CONSTRUCTION. (3)
Provides a working knowledge of occupational and job analysis and applies the techniques in building and reorganizing courses of study for effective use in vocational and occupational schools.

EDIN 464. LABORATORY ORGANIZATION AND MANAGEMENT. (3)
This course covers the basic elements of organizing and managing an industrial education program including the selection of equipment and the arrangement of the shop.

EDIN 465. MODERN INDUSTRY. (3)
This course provides an overview of manufacturing industry in the American social, economic and culture pattern. Representative basic industries are studied from the viewpoints of personnel and management organization, industrial relations, production procedures, distribution of products, and the like.

EDIN 466. EDUCATIONAL FOUNDATIONS OF INDUSTRIAL ARTS. (3)
A study of the factors which place industrial arts education in any well-rounded program of general education.

EDIN 467. PROBLEMS IN OCCUPATIONAL EDUCATION. (3)
The purpose of this course is to secure, assemble, organize, and interpret data relative to the scope, character and effectiveness of occupational education.

EDIN 471. HISTORY AND PRINCIPLES OF VOCATIONAL EDUCATION. (3)
An overview of the development of vocational education from primitive times to the present with special emphasis give to the vocational education movement with the American program of public education.

EDIN 475. RECENT TECHNOLOGICAL DEVELOPMENTS IN PRODUCTS AND PROCESSES. (3)
This course is designed to give the student an understanding of recent technological developments as they pertain to the products and processes of industry. The nature of their newer products and processes is studied as well as their effect upon modern industry and/or society.

EDIN 487. FIELD EXPERIENCE IN EDUCATION. (1-4)
Prerequisites: At least six semester hours in Education at the University of Maryland plus such other prerequisites as may be set by the major area in which the experience is to be taken. Planned field experience may be provided for selected students who have had teaching experience and who application for such field experience has been approved by the Education faculty. Field experience is offered in a given area to both major and non-major students.
Note—The total number of credits which a student may earn in EDIN 487, 888, and 889 is limited to a maximum of 20 semester hours.

EDIN 488. SPECIAL PROBLEMS IN EDUCATION. (1-3)
Prerequisite: Consent of instructor. Available only to mature students who have definite plans for individual study of approved problems. Course cards must have the title of the problem and the name of the faculty member who has approved it.

EDIN 499. WORKSHOPS, CLINICS, AND INSTITUTES. (1-6)
The maximum number of credits that may be earned under this course symbol toward any degree is six semester hours; the symbol may be used two or more times until six semester hours have been reached. The following type of educational enterprise may be scheduled under this course heading: Workshops Conducted By The College of Education (or developed cooperatively with other Colleges and Universities) and not otherwise covered in the present course listing; Clinical Experiences in Pupil-Testing Centers, Reading Clinics, Speech Therapy Laboratories, and Special Education Centers; institutes developed around specific topics or problems and intended for designated groups such as school superintendents, principals and supervisors.

EDUCATION, MEASUREMENT AND STATISTICS

EDMS 410. PRINCIPLES OF TESTING AND EVALUATION. (3)
Basic principles including the steps in the specification of instructional objectives and subsequent development of teacher-made tests; problems in the use and interpretation of achievement and aptitude tests; introduction to the development and use of non-testing evaluation procedures; basic considerations in the assignment of marks and grades; introduction to computer technology as applied to measurement.

EDMS 446. QUANTITATIVE RESEARCH METHODS I. (3)
An introduction to research design principles and the scientific method as applied to behavioral phenomena. Instrumentation procedures including the planning and construction of simple data collection instruments and their analysis, and assessment of the reliability and validity of such instruments. Statistical procedures appropriate to the analysis of data from simple research designs. Laboratory experiences in instrumentation and research design are emphasized.

EDMS 451. INTRODUCTION TO EDUCATIONAL STATISTICS. (3)
Designed as a first course in statistics for students in education. Emphasis is upon educational applications of descriptive statistics, including measures of central tendency, variability and association. Also included are inferential statistics through one-way anova.

EDMS 465. ALGORITHMIC METHODS IN EDUCATIONAL RESEARCH. (3)
Introduction to the use of the computer as a tool in educational research. Instruction in a basic scientific computer source language as well as practical experience in program writing for solving statistical and educational research problems.

EDUCATION, SECONDARY

EDSE 100. PRINCIPLES OF TYPEWRITING. (2)
Five periods per week. Prerequisite: consent of instructor. The goal of this course is the attainment of the ability to operate the typewriter continuously with reasonable speed and accuracy by the use of the "touch" system.

EDSE 101. INTERMEDIATE TYPEWRITING. (2)
Five periods per week. Prerequisite: Minimum grade of C in EDSE 100 or consent of instructor. Drills for improving speed and accuracy and an introduction to office production typewriting. This course must be completed prior to enrollment in EDSE 204.

EDSE 102. PRINCIPLES OF SHORTHAND. (3)
Prerequisite: Consent of instructor. Five periods per week. This course aims to develop the mastery of the principles of Gregg Shorthand.

EDSE 103. PRINCIPLES OF SHORTHAND. (3)
Prerequisite: Consent of instructor. Five periods per week. This course aims to develop the mastery of the principles of Gregg shorthand. Special emphasis is placed on developing dictation speed.

EDSE 151. FRESHMAN SEMINAR IN HOME ECONOMICS EDUCATION. (1)
Structure of home economics as a basis for curriculum decisions: structure of concepts; decisions about concept priorities in a home economics curriculum.

EDSE 200. OFFICE TYPEWRITING PROBLEMS. (2)
Five periods per week. Prerequisite: Minimum grade of "C" in EDSE 101 or consent of instructor. A course to develop the higher degree of accuracy and speed possible and to teach the advanced techniques of typewriting and special emphasis on production.

EDSE 201. SURVEY OF OFFICE MACHINES. (2)
Prerequisite: Sophomore standing. The various types of office business machines are surveyed, their capacities and special functions compared. Skill is developed through actual use and demonstration of such machines as: accounting, duplicating, dictating and transcribing, adding and calculating, and other functional types of machines and equipment. The course is designed also to give special training in the handling of practical business problems with machine application

EDSE 204. ADVANCED SHORTHAND AND TRANSCRIPTION. (3)
Prerequisite: Minimum grade of C in EDSE 101 and consent of instructor. Seven periods per week. Emphasis is placed on vocabulary development and new matter dictation for sustained speed at the highest level possible under varying conditions. Transcription is under timed conditions with emphasis on production involving quantity and quality of finished product.

EDSE 205. PROBLEMS IN TRANSCRIPTION. (3)
Prerequisite: Minimum grade of C in EDSE 204 or consent of instructor. Seven periods per week. A systematic development of recording skills under special and office-style dictation and transcription conditions with particular emphasis on transcriptional problems.

EDSE 210. SOPHOMORE SEMINAR IN HOME ECONOMICS EDUCATION. (1)
Weekly two-hour observation in urban area schools, integrated with home economics, methodologies for teaching secondary home economics, and roles of the secondary home economics teacher.

EDSE 260. INTRODUCTION TO ART EDUCATION. (3)
An introductory lecture-laboratory course designed to introduce the student to the field of art education as a profession. Each student will spend 4-6 weeks as a teacher aid in a school setting. Required as a prerequisite for admission into the remainder of the professional art education program. (The students need to leave Tuesday and Thursday P.M. free of other classes).

EDSE 288. SPECIAL PROBLEMS IN EDUCATION. (1-6)
Prerequisites: Consent of education advisor. Available only to freshmen and sophomore students who have definite plans for individual study of approved problems relative to their preparation for teaching.

EDSE 300. TECHNIQUES OF TEACHING OFFICE SKILLS. (3)
First semester. An examination and evaluation of the aims, methods, and course contents of each of the office skill subjects offered in the high school curriculum.

EDSE 304. ADMINISTRATIVE SECRETARIAL PROCEDURES. (3)
Prerequisite: EDSE 204 and 205 or consent of the instructor. The nature of office work, the secretary's function in communication, inter-company and public relations, handling records, supplies and equipment; and in direction of the office forms and procedures in relation to correspondence, mailing, receiving callers, telephoning, handling conferences, and securing business information. Business etiquette and ethics.

EDSE 305. SECRETARIAL OFFICE PRACTICE. (3)
Six periods per week. Prerequisite: Senior standing and completion of EDSE 304. The purpose of this course is to give laboratory and office experience to senior students. A minimum of 90 hours of office of experience under supervision is required. In addition, each student will prepare a written report on an original problem previously approved.

EDSE 330. PRINCIPLES AND METHODS OF SECONDARY EDUCATION. (3)
This course is concerned with the principles and methods of teaching in junior and senior high schools. Instructional problems common to all of the subject fields are considered in relation to the needs and interests of youth, the urgent social problems of today, and the central values to which our society is committed.

EDSE 340 to 354—CURRICULUM, INSTRUCTION AND OBSERVATION COURSES.

Offered in separate courses for the various subject matter areas. The objectives, selection and organization of subject matter, appropriate methods, lesson plans, textbooks and other instructional materials, measurement, and other topics pertinent to the particular subject matter area are treated. Twenty periods of observation. Students must reserve all day each Tuesday for observation in public schools.

EDSE 340. CURRICULUM, INSTRUCTION, AND OBSERVATION—ART. (3)

EDSE 341. CURRICULUM, INSTRUCTION, AND OBSERVATION—BUSINESS EDUCATION. (3)

EDSE 342. CURRICULUM, INSTRUCTION, AND OBSERVATION—DANCE. (3)

EDSE 343. CURRICULUM, INSTRUCTION, AND OBSERVATION—DISTRIBUTIVE EDUCATION. (3)

EDSE 344. CURRICULUM, INSTRUCTION, AND OBSERVATION—ENGLISH. (3)

EDSE 345. CURRICULUM, INSTRUCTION, AND OBSERVATION—FOREIGN LANGUAGE. (3)

EDSE 346. CURRICULUM, INSTRUCTION, AND OBSERVATION—GEOGRAPHY. (3)

EDSE 347. CURRICULUM, INSTRUCTION, AND OBSERVATION—HOME ECONOMICS. (3)

EDSE 350. CURRICULUM, INSTRUCTION, AND OBSERVATION—MATHEMATICS. (3)

EDSE 351. CURRICULUM, INSTRUCTION, AND OBSERVATION—MUSIC. (3)

EDSE 352. CURRICULUM, INSTRUCTION, AND OBSERVATION—SCIENCE. (3)

EDSE 353. CURRICULUM, INSTRUCTION, AND OBSERVATION—SOCIAL STUDIES. (3)

EDSE 354. CURRICULUM, INSTRUCTION, AND OBSERVATION—SPEECH. (3)

EDSE 360 to 377—STUDENT TEACHING COURSES.

Admission to student teaching requires a doctor's certificate indicating freedom from communicable diseases; the consent of the instructor in the appropriate area; previous enrollment at the University of Maryland for at least one semester. Undergraduate credit only. Offered in separate courses for the various areas. Application forms for this course must be submitted to the appropriate advisor by the middle of the semester preceding the one in which an assignment is desired. Students who register for this course serve as apprentice teachers in the schools to which they are assigned. For 8 credits, full time for one-half of the semester is devoted to this work. For experienced teachers and students in physical education, music education, and library science education who are planning to split student teaching assignment in elementary and secondary schools, the time and credit may be modified. Student teaching is a full-time commitment. Consequently, interference with this commitment due to employment is not permitted. Transportation to the school(s) assigned for student teaching is the responsibility of the student.

EDSE 360. STUDENT TEACHING IN SECONDARY SCHOOLS—ART. (2-8)

EDSE 361. STUDENT TEACHING IN SECONDARY SCHOOLS—BUSINESS EDUCATION. (2-8)

EDSE 362. STUDENT TEACHING IN SECONDARY SCHOOLS—DANCE. (2-8)

EDSE 363. STUDENT TEACHING IN SECONDARY SCHOOLS—DISTRIBUTIVE EDUCATION. (2-8)

EDSE 364. STUDENT TEACHING IN SECONDARY SCHOOLS—ENGLISH. (2-8)

EDSE 365. STUDENT TEACHING IN SECONDARY SCHOOLS—FOREIGN LANGUAGES. (2-8)

EDSE 366. STUDENT TEACHING IN SECONDARY SCHOOLS—GEOGRAPHY. (2-8)

EDSE 367. STUDENT TEACHING IN SECONDARY SCHOOLS—HEALTH. (2-8)

EDSE 370. STUDENT TEACHING IN SECONDARY SCHOOLS—HOME ECONOMICS. (2-8)

EDSE 371. STUDENT TEACHING IN SECONDARY SCHOOLS—LIBRARY. (2-8)

EDSE 372. STUDENT TEACHING IN SECONDARY SCHOOLS—MATHEMATICS. (2-8)

EDSE 373. STUDENT TEACHING IN SECONDARY SCHOOLS—MUSIC. (2-8)

EDSE 374. STUDENT TEACHING IN SECONDARY SCHOOLS—PHYSICAL EDUCATION. (2-8)

EDSE 375. STUDENT TEACHING IN SECONDARY SCHOOLS—SCIENCE. (2-8)

EDSE 376. STUDENT TEACHING IN SECONDARY SCHOOLS—SOCIAL STUDIES. (2-8)

EDSE 377. STUDENT TEACHING IN SECONDARY SCHOOLS—SPEECH. (2-8)

EDSE 402. METHODS AND MATERIALS IN TEACHING BOOKKEEPING AND RELATED SUBJECTS. (3)
Important problems and procedures in the mastery of bookkeeping and related office knowledge and the skills including a consideration of materials and teaching procedures.

EDSE 403. PROBLEMS IN TEACHING OFFICE SKILLS. (3)
Problems in development of occupational competency, achievement tests, standards of achievement, instructional materials, transcription, and the integration of office skills.

EDSE 404. BASIC BUSINESS EDUCATION IN THE SECONDARY SCHOOLS. (3)
Includes consideration of course objectives; subject matter selection; and methods of organization and presenting business principles, knowledge and practices.

EDSE 415. FINANCIAL AND ECONOMIC EDUCATION I. (3)
Materials, resources and content of personal finance and economics courses in the public schools. This course deals with the problems of teaching, and the content used to convey the consumer's role in relation to this earnings and spending power.
spending power.

EDSE 416. FINANCIAL AND ECONOMIC EDUCATION II. (3)
Materials, resources and content of personal finance and economics courses in the public schools. This course deals with the problems of teaching, and the content used to convey means for intelligent planning and handling of personal and family resources.

EDSE 420. ORGANIZATION AND COORDINATION OF DISTRIBUTIVE EDUCATION PROGRAMS. (3)
This course deals specifically with such areas as the organization of a cooperative distributive education program; the development of an effective cooperative relationship between coordinator and training sponsor; the selection, orientation, and training of sponsors; analysis of training opportunities, reports and records; the evaluation and selection of students for part-time cooperative work assignments; and the evaluation of the program.

EDSE 421. METHODS AND MATERIALS IN DISTRIBUTIVE EDUCATION. (3)
This course covers basic methods and materials needed to teach the preparatory classroom related instruction of a one or two year distributive education program. It deals specifically with the organization of special supplemen-

tary materials for individual and group instruction—Youth Club programs, organization and administration.

EDSE 423. FIELD EXPERIENCES IN VOCATIONAL AREAS. (3)
A—HOME ECONOMICS EDUCATION.
B—BUSINESS EDUCATION.
C—DISTRIBUTIVE EDUCATION.
Supervised work experience in an occupation related to vocational education. Application of theory to work situations as a basis for teaching in vocational education programs. By individual arrangement with advisor.

EDSE 425. CURRICULUM DEVELOPMENT IN HOME ECONOMICS. (3)
Basis for curriculum decisions; tools for planning and evaluating curriculum; methodology of conceptual teaching.

EDSE 426. EVALUATION OF HOME ECONOMICS. (3)
The meaning and function of evaluation in education; the development of a plan for evaluating a homemaking program with emphasis upon types of evaluation devices, their construction and use.

EDSE 430. CORRECTIVE-REMEDIAL READING INSTRUCTION. (3)

EDSE 431. LABORATORY PRACTICES IN READING. (2-4)

EDSE 432. THE JUNIOR HIGH SCHOOL. (2-3)
A general overview of the junior high school. Purposes, functions and characteristics of this school unit; a study of its population, organization, program of studies, methods, staff, and other topics, together with their implications for prospective teachers.

EDSE 440. METHODS OF TEACHING ENGLISH IN SECONDARY SCHOOLS. (3)

EDSE 441. PRACTICUM IN ART EDUCATION. (3)
One two-hour lecture discussion period and two, two-hour laboratory sessions per week. Instruction will be aimed at reviewing experiences in a chosen medium of art and assembling a workable procedure to present the content to secondary school students. The course will provide a studio setting in which the student will assemble materials for an in-depth study of the practical work involved and attempt to develop a total concept in a particular area of art.

EDSE 442. TEACHING THE AUDIO-LINGUAL SKILLS IN FOREIGN LANGUAGES. (3)

EDSE 444. METHODS OF TEACHING MATHEMATICS IN SECONDARY SCHOOLS. (3)

EDSE 446. METHODS OF TEACHING SCIENCE IN SECONDARY SCHOOLS. (3)

EDSE 447. METHODS OF TEACHING SOCIAL STUDIES IN SECONDARY SCHOOLS. (2-3)

EDSE 450. SPEECH METHODS AND RESOURCES IN SECONDARY SCHOOLS. (3)

EDSE 453. THE TEACHING OF READING IN THE SECONDARY SCHOOL. (3)

EDSE 460. ENVIRONMENTAL EDUCATION. (3)
Two lecture-discussion periods and one three-hour laboratory-field experience session per week. An interdisciplinary course covering the literature, techniques and stratigies of environmental education. Emphasis is upon the study of environmental education programs and the development of a specific program which is designed to implement the solution of an environmental problem. The laboratory-field experience is provided as a model for future activities of students. Open to any student who wishes to become actively involved in the process of environmental education program development.

EDSE 470. TEACHING OF ART CRITICISM IN PUBLIC SCHOOLS. (3)
Introduction to various alternative theories of aesthetics as related to the teaching of art.

EDSE 489. FIELD EXPERIENCE IN EDUCATION. (1-4)
Prerequisites: At least six semester hours in education at the University of Maryland plus such other prerequisites as may be set by the secondary education department. Planned field experience may be provided for selected students who have had teaching experience and whose application for such field experience has been approved by the secondary education faculty. Field experience is offered in a given area to both major and non-major students.
NOTE—The total number of credits which a student may earn in EDSE 489, 888, and 889 is limited to a maximum of 20 semester hours.

EDSE 498. SPECIAL PROBLEMS IN EDUCATION. (1-3)
Prerequisite: Consent of instructor. Available only to mature students who have definite plans for individual study of approved problems.

EDSE 499. WORKSHOPS, CLINICS, AND INSTITUTES. (1-6)
The maximum number of credits that may be earned under this course symbol toward any degree is six semester hours; the symbol may be used two or more times until six semester hours have been reached. The following type of educational enterprise may be scheduled under this course heading: Workshops conducted by the college of education (or developed cooperatively with other colleges and universities) and not otherwise covered in the present course listing; clinical experiences in pupil-testing centers, reading clinics, speech therapy laboratories, and special education centers; institutes developed around specific topics or problems and intended for designated groups such as school superintendents, principals and supervisors.

EDUCATION, SPECIAL

EDSP 288. SPECIAL PROBLEMS IN EDUCATION. (1-6)
Prerequisite: Consent of Special Education advisor; open only to Special Education majors. Available only to freshmen and sophomore students who have definite plans for individual study of approved problems relative to their preparation for teaching. Such study will usually take the form of a field experience as a teacher's aide in a special education program for one-half day each week.

EDSP 349. STUDENT TEACHING OF EXCEPTIONAL CHILDREN. (8)
A doctor's certificate indicating freedom from communicable diseases and approval of department required. Undergraduate credit only. Students in special education enroll in 8 credits of EDEL 333 for 8 weeks during the same semester. No other courses may be taken during a full semester of student teaching.

EDSP 470. INTRODUCTION TO SPECIAL EDUCATION. (3)
Prerequisite: EDSP 288. Designed to give an understanding of the needs of all types of exceptional children, stressing preventive and remedial measures.

EDSP 471. CHARACTERISTICS OF EXCEPTIONAL CHILDREN—MENTALLY RETARDED. (3)
Prerequisite: EDSP 470 or equivalent. Studies the diagnosis, etiology, physical, social and emotional characteristics of exceptional children.

EDSP 472. EDUCATION OF EXCEPTIONAL CHILDREN—MENTALLY RETARDED. (3)
Prerequisite: EDSP 471 or equivalent. Offers practical and specific methods of teaching exceptional children. Selected observation of actual teaching may be arranged.

EDSP 473. CURRICULUM FOR EXCEPTIONAL CHILDREN—MENTALLY RETARDED. (3)
Prerequisite: EDSP 471 or equivalent. Examines the principles and objecitves guiding curriculum for exceptional children; gives experience in developing curriculum; studies various curricula currently in use.

EDSP 475. EDUCATION OF THE SLOW LEARNER. (3)
Studies the characteristics of the slow learner and those educational practices which are appropriate for the child who is functioning as a slow learner.

EDSP 481. CHARACTERISTICS OF EXCEPTIONAL CHILDREN—GIFTED. (3)
Prerequisite: EDSP 470 or equivalent. Studies the diagnosis, etiology, physical, social, and emotional characteristics of exceptional children.

EDSP 482. EDUCATION OF EXCEPTIONAL CHILDREN—GIFTED. (3)
Prerequisite: EDSP 481 or equivalent. Offers practical and specific methods of teaching exceptional children. Selected observation of actual teaching may be arranged.

EDSP 483. CURRICULUM FOR EXCEPTIONAL CHILDREN—GIFTED. (3)
Prerequisite: EDSP 481 or equivalent. Examines the principles and objectives guiding current curriculum for exceptional children; gives experience in developing curriculum; studies various curricula currently in use.

EDSP 489. FIELD EXPERIENCE IN SPECIAL EDUCATION. (1-4)
Prerequisites: At least six semester hours in special education at the University of Maryland plus such other prerequisites as may be set by the special education department. Planned field experience may be provided for selected students who have had teaching experience has been approved by the special education faculty.
NOTE—The total number of credits which a student may earn in EDSP 489, 888, and 889 is limited to a maximum of 20 semester hours.

EDSP 491. CHARACTERISTICS OF EXCEPTIONAL CHILDREN—PERCEPTUAL LEARNING PROBLEMS. (3)
Prerequisite: EDSP 470 or equivalent. Studies the diagnosis, etiology, physical, social, and emotional characteristics of exceptional children.

EDSP 492. EDUCATION OF EXCEPTIONAL CHILDREN—PERCEPTUAL LEARNING PROBLEMS. (3)
Prerequisite: EDSP 491 or equivalent. Offers practical and specific methods of teaching exceptional children. Selected observation of actual teaching may be arranged.

EDSP 493. CURRICULUM FOR EXCEPTIONAL CHILDREN—PERCEPTUAL LEARNING PROBLEMS. (3)
Prerequisite: EDSP 492 or equivalent. Examines the principles and objectives guiding curriculum for exceptional children; gives experience in developing curriculum; studies various curricula currently in use.

EDSP 498. SPECIAL PROBLEMS IN SPECIAL EDUCATION. (1-3)
Prerequisite: Consent of instructor. Available only to mature students who have definite plans for individual study of approved problems.

EDSP 499. WORKSHOPS, CLINICS, AND INSTITUTES IN SPECIAL EDUCATION. (1-6)
The maximum number of credits that may be earned under this course symbol toward any degree is six semester hours; the symbol may be used two or more times until six semester hours have been reached. The following type of educational enterprise may be scheduled under this course heading: Workshops conducted by the special education department (or developed cooperatively with other departments, colleges and universities) and not otherwise covered in the present course listing. Laboratories, and special education centers; institutes developed around specific topics or problems and intended for designated groups such as school superintendents, principals and supervisors.

EDUCATION

EDUC 288. SPECIAL PROBLEMS IN EDUCATION. (1-6)
Prerequisite: Consent of education advisor. Available only to freshmen and sophomore students who have definite plans for individual study of approved problems relative to their preparation for teaching.

EDUC 300. HUMAN DEVELOPMENT AND LEARNING. (6)
Open only to students approved for teacher education. Studies scientific facts that describe growth, development, and learning and the implications of these for the teacher and the school. A study of an individual child and a classroom participation experience are integral parts of the course and require a one-half day per week assignment in a public school as a teacher aide. Students are scheduled for field assignments in an elementary or high school according to the curriculum they are in. Each group is under the supervision of a faculty member with whom it meets every second week in a seminar session.

EDUC 301. FOUNDATIONS OF EDUCATION (3)
Prerequisites: EDUC 300, completion of at least 90 hours and approval for admission to teacher education. Historical, social, cultural, and philosophical foundations of American education. Considers education as a profession, and the organizational structure, operation and function of modern school systems. Comparative education and contemporary issues are included.

EDUC 370. INTRODUCTION TO LIBRARIANSHIP. (3)
An overview of the library profession. Development of public, academic, special and school services. History of books and libraries. The library as a social institution. The impact of communication media on society. Philosophy of librarianship. Professional standards, organizations and publications.

EDUC 371. BASIC REFERENCE AND INFORMATION SOURCES. (3)
Evaluation, selection, and utilization of information sources in subject areas, including encyclopedias, dictionaries, periodical indexes, atlases, yearbooks. Study of bibliographical methods and form.

EDUC 372. CATALOGING AND CLASSIFICATION OF LIBRARY MATERIALS. (3)
Principles and practice in the organization of library materials. Dewey Decimal Classification, rules for the dictionary catalog, Sears subject headings. Treatment of non-book materials. Cataloging aids and tools.

EDUC 373. LIBRARY MATERIALS FOR CHILDREN. (3)
Reading interests of children. Advanced study of children's literature. Survey and selection of informational materials in subject fields including: books, periodicals, films, filmstrips, records, pictures, pamphlet materials.

EDUC 374. LIBRARY MATERIALS FOR YOUTH. (3)
Reading interests of young people. Literature for adolescents. Selection of informational materials in subject fields including: books, periodicals, films, filmstrips, records, pictures, pamphlet materials.

EDUC 375. SCHOOL LIBRARY ADMINISTRATION AND SERVICE. (3)
Acquisition, circulation, utilization and maintenance of library materials. Organization of effective school library programs. School library quarters and equipment. Publicity and exhibits. Evaluation of library services.

EDUC 410. HISTORY OF EDUCATION IN WESTERN CIVILIZATION. (3)
Educational institutions through the ancient, medieval and early modern periods in western civilization, as seen against a background of socio-economic development.

EDUC 411. HISTORY OF EDUCATION IN THE UNITED STATES. (3)
A study of the origins and development of the chief features of the present system of education in the United States.

EDUC 420. PHILOSOPHY OF EDUCATION. (3)
A study of the great educational philosophers and systems of thought affecting the development of modern education.

EDUC 421. LOGIC OF TEACHING. (3)
An analysis of the structure of basic subject matters in

the curriculum and of the standard logical moves in teaching.

EDUC 430. EDUCATIONAL SOCIOLOGY. (3)
Deals with data of the social sciences which are germane to the work of teachers. Implications of democratic ideology for educational endeavor, educational tasks imposed by changes in population and technological trends, the welfare status of pupils, the socio-economic attitudes of individuals who control the schools, and other elements of community background.

EDUC 440. AUDIOVISUAL EDUCATION. (3)
Sensory impressions in their relation to learning projection apparatus, its cost and operation; slides, filmstrips and films, physical principles underlying projection; auditory aids to instruction; field trips; pictures, models and graphic materials; integration of sensory aids with organized instruction. Recommended for all education students.

EDUC 441. GRAPHIC MATERIALS FOR INSTRUCTION. (3)
Prerequisite: EDUC 440 or consent of instructor. A laboratory course which combines graphic and photographic processes for education and training purposes. Techniques include lettering, coloring, transparencies, illustrations, converting, duplicating transparent and opaque media. Emphasis is placed on appropriate media selection for target audiences. Heavy student project orientation.

EDUC 442. INSTRUCTIONAL MEDIA SERVICES. (3)
Prerequisites: Teaching experience and EDUC 440, or equivalent. Procedures for coordinating instructional media programs; instructional materials acquisition, storage, scheduling, distribution, production, evaluation and other service responsibilities; instructional materials center staff coordination of research, curriculum improvement and faculty development programs.

EDUC 443. INSTRUCTIONAL TELEVISION UTILIZATION. (3)
Combining televised lessons, on-campus seminars, and related workbook assignments. This course focuses upon planning for the various uses of instructional television with students. State, local school unit, school, and classroom uses will be illustrated through film and studio production. The aspects of producing ITV programs are developed through the television lessons and 'Hands-On' assignments of the seminars.

EDUC 444. PROGRAMMED INSTRUCTION. (3)
Analysis of programmed instruction techniques: Selection, utilization and evaluation of existing programs and teaching machines; developing learning objectives; writing and validating programs.

EDUC 489. FIELD EXPERIENCE IN EDUCATION. (1-4)
A—ADULT EDUCATION
B—FOUNDATIONS
C—HIGHER EDUCATION
Prerequisites: At least six semester hours in education at the University of Maryland plus such other prerequisites as may be set by the major area in which the experience is to be taken. Planned field experience may be provided for selected students who have had teaching experience and whose application for such field experience has been approved by the education faculty. Field experience is offered in a given area to both major and nonmajor students.
Note: The total number of credits which a student may earn in EDUC 489, EDUC 888, and EDUC 889 is limited to a maximum of twenty semester hours.

EDUC 498. SPECIAL PROBLEMS IN EDUCATION. (1-3)
Prerequisite: Consent of instructor. Available only to mature students who have definite plans for individual study of approved problems.

EDUC 499. WORKSHOPS, CLINICS, AND INSTITUTES. (1-6)
The maximum number of credits that may be earned under this course symbol toward any degree is six semester hours; the symbol may be used two or more times until six semester hours have been reached. The following type of educational enterprise may be scheduled under this course heading: workshops conducted by the College of Education (or developed cooperatively with other colleges and universities) and not otherwise covered in the present course listing; clinical experiences in pupil-testing centers, reading clinics, speech therapy laboratories, and special education centers; institutes developed around specific topics or problems and intended for designated groups such as school superintendents, principals and supervisors.

ENGINEERING, AEROSPACE

ENAE 201. INTRODUCTION TO AEROSPACE ENGINEERING I. (2)
One lecture and one laboratory per week. Prerequisite: ENES 110. Required of sophomores in aerospace engineering. Characteristics of the atmosphere, lifting surfaces, drag, propulsion systems, and aircraft control.

ENAE 202. INTRODUCTION TO AEROSPACE ENGINEERING II. (2)
One lecture and one laboratory per week. Prerequisite: ENAE 201. Required of sophomores in aerospace engineering. Guidance, structures, and performance of aerospace vehicles. Weather, safety, and flight simulation. The aerospace industry and aerospace engineering as a profession.

ENAE 203. TECHNICAL WRITING. (1)
One lecture per week. Corequisite: ENAE 201. Required of sophomores in aerospace engineering. Technical writing as a means of effective professional communication. Practice in the writing process with attention to grammar and style. Tables, graphs, and figures.

ENAE 305. AEROSPACE LABORATORY I. (2)
One lecture and one laboratory per week. Prerequisite: ENEE 300. Corequisites: ENAE 345, ENAE 351, and ENAE 371. Required of juniors in aerospace engineering. Measurement philosophy, data analysis, error assessment, sensing devices, optical methods, material tests; flow visualization techniques, manometry, dynamic response of measurement systems. Application of instrumentation in aerospace technology.

ENAE 345. FLIGHT DYNAMICS. (3)
Three lectures per week. Prerequisites: ENES 221 and MATH 246. Required of juniors in aerospace engineering. Kinematics and concept of system state. Dynamic principles applied to particles, discrete mass and continuously distributed mass systems. Lagrangian dynamics. Dynamic stability of systems. Applications to dynamics of aerospace vehicles and vehicle components.

ENAE 351. FLIGHT STRUCTURES I. (4)
Three lectures and one laboratory per week. Prerequisite: ENES 220. Required of juniors in aerospace engineering. An introduction to the analysis of aircraft structural members. Introduction to theory of elasticity, mechanical behavior of materials, thermal effects, finite-difference solutions, virtual work, variational and energy principles for static systems.

ENAE 352. FLIGHT STRUCTURES II. (3)
Three lectures per week. Prerequisite: ENAE 351. Required of juniors in aerospace engineering. Application of variational and energy principles to analysis of elastic bodies. Stresses and deflections of beams including effects of non-principal axes, non-homogeneity, and thermal gradients. Differential equations of beams, bars, and cables. Stresses and deflections of torsional members. Stresses due to shear. Deflection analysis of structures.

ENAE 371. AERODYNAMICS I. (3)
Three lectures per week. Prerequisites: ENAE 202, PHYS 262, MATH 241 and concurrent registration in MATH 246. Required of juniors in aerospace engineering. Basic fluid mechanics and aerodynamic theory.

ENAE 401. AEROSPACE LABORATORY II. (2)
One lecture and one laboratory per week. Prerequisites: ENAE 305 and ENAE 345. Corequisites: ENAE 352 and ENAE 471. Required of seniors in aerospace engineering. Application of fundamental measurement techniques to experiments in aerospace engineering. Structural, aerodynamic, and propulsion tests. Correlation of theory with experimental results.

ENAE 402. AEROSPACE LABORATORY III. (1)
One laboratory per week. Prerequisites: ENAE 305 and ENAE 345. Corequisites: ENAE 352, ENAE 471, and ENAE 475. Application of fundamental measurement techniques to experiments in aerospace engineering. Structural, aerodynamic, flight simulation, and heat transfer tests. Correlation of theory with experimental results.

ENAE 411. AIRCRAFT DESIGN. (3)
Two lectures and one laboratory period each week. Prerequisites: ENAE 345, ENAE 351 and ENAE 371. Design elective for seniors in aerospace engineering. Theory, background and methods of airplane design, subsonic, supersonic and VSTOL.

ENAE 412. DESIGN OF AEROSPACE VEHICLES. (3)
Two lectures and one laboratory per week. Prerequisites: ENAE 345 and ENAE 371. Design elective for seniors in aerospace engineering. Theory, background and methods of space vehicle design for manned orbiting vehicles, manned lunar and Martian landing systems.

ENAE 445. DYNAMICS OF AEROSPACE VEHICLES. (3)
Three lectures per week. Prerequisite: ENAE 345 and ENAE 371. Dynamics elective for senior students in aerospace engineering. Stability, control and miscellaneous topics in dynamics.

ENAE 455. AIRCRAFT VIBRATIONS. (3)
Three lectures per week. Prerequisite: ENAE 345. Corequisite ENAE 352. Dynamics elective for senior students in aerospace engineering. Vibrations and other dynamic problems occurring in aerospace structures. Study topics include free and forced vibrations of single and multiple degree of freedom systems, and of continuous systems.

ENAE 457. FLIGHT STRUCTURES III. (3)
Three lectures each week. Prerequisite: ENAE 352 or equivalent. Elective for seniors in aerospace engineering. An advanced undergraduate course dealing with the theory and analysis of the structures of flight vehicles. Topics will include, stresses due to shear, indeterminate structures, matrix methods, plate theory, buckling and failure of plates.

ENAE 461. FLIGHT PROPULSION I. (3)
Two lectures and one laboratory per week. Prerequisites: ENME 216 and ENAE 471. Required of seniors in aerospace engineering. Operating principles of piston, turbojet, turboprop, ramjet and rocket engines. Thermodynamic cycle analysis and engine performance. Aerothermochemistry of combustion, fuels, and propellants.

ENAE 462. FLIGHT PROPULSION II. (3)
Two lectures and one laboratory per week. Prerequisite: ENAE 461. Elective for seniors in aerospace engineering. Extension of material in ENAE 461. Advanced and current topics in flight propulsion.

ENAE 471. AERODYNAMICS II. (3)
Three lectures per week. Prerequisites: ENAE 371 and ENME 216. Required of seniors in aerospace engineering. Elements of compressible flow with applications to aerospace engineering problems.

ENAE 472. AERODYNAMICS III. (3)
Three lectures per week. Prerequisite: ENAE 371. Elective for seniors in aerospace engineering. Theory of the flow of an incompressible fluid.

ENAE 473. AERODYNAMICS OF HIGH SPEED FLIGHT. (3)
Three lectures per week. Prerequisite: ENAE 372 or equivalent. Elective course for seniors in aerospace engineering. An advanced course dealing with aerodynamic problems of flight at supersonic and hypersonic velocities. Topics will include unified hypersonic and supersonic small disturbance theories, real gas effects, aerodynamic heating and mass transfer with applications to hypersonic flight and re-entry.

ENAE 475. VISCOUS FLOW AND AERODYNAMIC HEATING. (3)
Three lectures per week. Prerequisites: ENAE 371, ENAE 471, and ENME 216. Required course for aerospace seniors. Fundamental aspects of viscous flow, Navier-Stokes equations, similarity, boundary layer equations; laminar, transitional and turbulent incompressible flows on airfoils, thermal boundary layers and convective heat transfer. Conduction through solids. Introduction to radiative heat transfer.

ENAE 488. TOPICS IN AEROSPACE ENGINEERING. (1-4)
Technical elective taken with the permission of the student's advisor and instructor. Lecture and conference courses designed to extend the student's understanding of aerospace engineering. Current topics are emphasized.

ENAE 499. ELECTIVE RESEARCH. (1-3)
May be repeated to a maximum of three credits. Elective for seniors in aerospace engineering with permission of the student's advisor and the instructor. Original research projects terminating in a written report.

ENGINEERING, CIVIL

ENCE 221. INTRODUCTION TO ENVIRONMENTAL ENGINEERING. (3)
Prerequisite: One semester of Chemistry and Physics. An introductory course which provides an exposition of those physical, chemical, and biological systems relating to the quality of the land, water, and air environments. Current environmental pollution problems will be examined and methods of pollution abatement discussed.

ENCE 280. ENGINEERING SURVEY MEASUREMENTS. (3)
Two lectures and one laboratory per week. Prerequisite: MATH 141 or concurrent registration. Standards, units, calibration, measurement of distance, elevation, angles, systematic and random error analysis in measurements, fundamentals of mapping, instrumentation.

ENCE 300. FUNDAMENTALS OF ENGINEERING MATERIALS. (3)
Two lectures and one laboratory per week. Prerequisite: ENES 220 or concurrent registration. Properties and constitution of the principal materials used in civil engineering. Laboratory tests for these properties, interpretation of test results and of specifications.

ENCE 330. BASIC FLUID MECHANICS. (3)
Three lectures per week. Prerequisite: ENES 220, 221, PHYS 262. The study of fluids at rest and in motion. Principles of viscous and turbulent flow. Impulse and momentum concepts. Pumps, turbines and meters. Dimensional analysis and laws of similarity.

ENCE 340. FUNDAMENTALS OF SOIL MECHANICS. (3)
Three lectures per week. Prerequisites: ENES 220 and ENCE 300. Introductory study of the mechanics of aggregations and its application to earthworks and foundations. Engineering geology relative to civil engineering and soil mechanics.

ENCE 350. FUNDAMENTALS OF STRUCTURAL ANALYSIS. (3)
Three lectures per week. Prerequisite: ENES 220. Concurrent registration in ENCE 300. Basic statics and mechanics of structural systems. Introduction to indeterminate analysis.

ENCE 351. BASIC STRUCTURAL DESIGN. (3)
Three lectures per week. Prerequisite: ENCE 350. Basic elements of structural design of wood, steel and concrete without dependence on individual specifications. Classical design of beams, trusses, columns, connections and foundations.

ENCE 360. ENGINEERING ANALYSIS AND COMPUTER PROGRAMMING. (3)
Three lectures per week. Prerequisite: ENCE 381 or concurrent registration. Elements of operational calculus, vector analysis, numerical methods and programming computers. Errors, interpolation, series, integration, iteration and solution of equations.

ENCE 370. FUNDAMENTALS OF TRANSPORTATION ENGINEERING. (3)
Prerequisite: ENCE 280. Engineering problems of transportation by airways, highways, pipelines, railways, and waterways. Elementary dynamics of traffic and functional consideration of routes and terminals.

ENCE 381. APPLIED MATHEMATICS IN ENGINEERING. (3)
Three lectures per week. Prerequisite: MATH 241. Mathematical technique applied to the analysis and solution of engineering problems. Use of differentiation, integration, differential equations, and integral transforms. Application of infinite series, numerical and statistical methods.

ENCE 400. ADVANCED MATERIALS OF ENGINEERING. (3)
Three lectures per week. Prerequisite: ENCE 300. Mechanisms of the behavior of materials under repeated, sustained and impact loads in relation to their environment. Influence of microstructure on mechanical properties. Fracture theory rheological aspects of the characteristics of selected materials.

ENCE 410. ADVANCED STRENGTH OF MATERIALS. (3)
Three lectures per week. Prerequisite: ENES 220. Strength and deformation of deformable bodies, plane stress and strain. Torsion theory, unsymmetrical bending, curved beams. Behavior of beams, columns, slabs, plates and composite members unload. Elastic and inelastic stability.

ENCE 411. EXPERIMENTAL STRESS ANALYSIS. (4)
Prerequisite: ENES 220. Three lectures and one laboratory per week. Application of experimental data on materials to design problems. Correlation of analytical and experimental methods of analysis with design. Electric strain gages, photoelasticity, brittle lacquer methods and various analogies.

ENCE 420. BASIC CIVIL ENGINEERING PLANNING I. (2)
Two lectures per week. Prerequisites or corequisites: ENCE 340, 351, and 370. Lectures in the methodology used in the general practice of civil engineering but with special emphasis on planning of extensive civil engineering works. In addition, preparation of engineering reports, specifications and projects presentation, economics, functional aspects.

ENCE 421. BASIC CIVIL ENGINEERING PLANNING II. (1)
One laboratory of three hours per week. Prerequisite: ENCE 420. Laboratory for application of the program and principles developed in Basic Civil Engineering Planning I.

ENCE 430. INTERMEDIATE FLUID MECHANICS. (4)
Three lectures and one laboratory per week. Prerequisite: ENCE 330. The study of the properties and flow of an ideal fluid. Viscosity, laminar and turbulent flow, flow nets, uniform flow, source, irrotational motion and circulation. Turbulence and boundary layers.

ENCE 431. SURFACE WATER HYDROLOGY. (3)
Prerequisites: ENCE 360, 330. Concurrent registration in ENCE 460 or permission of instructor. Study of the physical processes of the hydrologic cycle, hydrometerology, concepts of weather modification, evaporation and transpiration infiltration studies, run off computations, flood routing, reservoir requirements, emphasis on process simulation as a tool in water resource development.

ENCE 432. GROUND WATER HYDROLOGY. (3)
Prerequisites: ENCE 330, ENCE 460 or permission of instructor. Concepts related to the development of the ground water resource, hydrogeology, hydrodynamics of flow through porous media, hydraulics of wells, artificial recharge, sea water intrusion, basin-wide ground water development.

ENCE 433. ENVIRONMENTAL HEALTH ENGINEERING ANALYSIS. (3)
Two lectures and one laboratory per week. The theory and analytical techniques used in evaluating man's environment. Emphasis is given to the areas of quantitative, physical, electroanalytical and organic chemistry as applied to chemical analysis of water.

ENCE 434. AIR POLLUTION. (3)
Three lectures per week. Classification of atmospheric pollutants and their effects on visibility, inanimate and animate receptors. Evaluation of source emissions and principles of air pollution control; meteorological factors governing the distribution and removal of air pollutants; air quality measurements and air pollution control legislation.

ENCE 435. SANITARY ENGINEERING ANALYSIS AND DESIGN. (4)
Three lectures and one laboratory per week. Prerequisite: ENCE 221 and ENCE 330. The application of sanitary analysis and fundamental principles to the design and operation of water and waste water treatment plants and the control of stream pollution.

ENCE 440. ADVANCED SOIL MECHANICS. (4)
Three lectures and one laboratory per week. Prerequisite: ENCE 340. Theories of strength, compressibility, capillarity and permeability. Critical review of theories and methods of measuring essential properties. Planning, execution and interpretation of soil testing programs.

ENCE 441. SOIL-FOUNDATION SYSTEMS. (3)
Three lectures per week. Prerequisite: ENCE 340. Soil mechanics and foundation analysis are integrated in a systems approach to the analysis and design of soil foundation-structural systems. Inter-action of bearing capacity, settlements, lateral pressures, drainage, vibrations, stress distributions, etc., are included for a variety of structural systems.

ENCE 450. STRUCTURAL ANALYSIS. (3)
Three lectures per week. Prerequisite: ENCE 351. Advanced indeterminate structures, members of variable section, laterally loaded frames, continuous trusses and secondary stresses.

ENCE 451. STRUCTURAL DESIGN. (4)
Three lectures and one laboratory per week. Prerequisite: ENCE 351. Steel and reinforced concrete design of bridges and buildings using appropriate controlling specifications. Advanced problems of modern steel and reinforced concrete.

ENCE 460. COMPUTER ANALYSIS. (3)
Two lectures and one laboratory per week. Prerequisites: ENCE 360 and ENCE 350. Computer methods and techniques applied to civil engineering problems with emphasis on structural systems.

ENCE 461. ANALYSIS OF CIVIL ENGINEERING SYSTEMS I. (3)
Prerequisite: Senior standing or consent of instructor. Application of the principles of engineering economy and statistics to the solution of Civil Engineering problems. Economic comparison of alternatives using present worth, annual cost, rate of return and cost benefit analyses. Development and use of simple and multiple regression models, and statistical decision theory.

ENCE 462. ANALYSIS OF CIVIL ENGINEERING SYSTEMS II. (3)
Prerequisite. ENCE 461 or equivalent. Application of iconic, analytic, numeric, and probabilistic models to the solution of civil engineering problems. Existing inventory, allocation replacement, and competitive models are examined. Emphasis is on model construction and solution, and implementation of the obtained solutions.

ENCE 470. HIGHWAY ENGINEERING. (3)
Three lectures per week. Prerequisite: ENCE 340. Location, design, construction and maintenance of roads and pavements. Introduction to traffic engineering.

ENCE 471. TRANSPORTATION ENGINEERING. (3)
Three lectures per week. Prerequisite: ENCE 370. A study of the principles of transportation engineering as applied to the various modes of transport. Consideration is given to cost analysis, economic aspects of route and site selection and layout. The organization and administration of engineering functions.

ENCE 472. HIGHWAY AND AIRFIELD PAVEMENT DESIGN. (3)
Prerequisites: ENCE 340, 370, and 470 or equivalent. Two lectures and one laboratory per week. Principles of pavement analysis and design. Analysis of moving loads and pavement response. Subgrade evaluation and benefication. Flexible and rigid pavement design; related materials specifications and tests.

ENCE 489. SPECIAL PROBLEMS. (3)
Prerequisite: Senior standing. A course arranged to meet the needs of exceptionally well prepared students for study in a particular field of civil engineering.

ENGINEERING, CHEMICAL

ENCH 215. CHEMICAL ENGINEERING ANALYSIS I. (3)
Prerequisite: CHEM 104 or equivalent. Introduction to methods of chemical engineering analysis. Stoichiometric relations, use of computers, stagewise computations, and application of material and energy balances to chemical engineering operations and processes.

ENCH 237. CHEMICAL TECHNOLOGY LABORATORY. (1)
Prerequisite: ENCH 215 or concurrent registration. Techniques of basic chemical engineering measurement. Theory and application of temperature and pressure measurement. Basic thermodynamic measurements including calorimetry and vapor pressures. Methods of purification and detection of impurities in solids, liquids and gases. Elements of reaction kinetics.

ENCH 250. CHEMICAL ENGINEERING ANALYSIS II. (2)
Prerequisite: ENCH 215. Methods of chemical engineering analysis. Computational methods, optimization and control techniques, and other numerical tools applied to chemical processing systems. Analytical and computer methods are presented.

ENCH 295. CHEMICAL PROCESS THERMODYNAMICS. (3)
Prerequisite: CHEM 104, principles of thermodynamics and their application to engineering problems. First and second laws of thermodynamics, properties of gases, liquids and solids, phase equilibrium, flow and non-flow systems, energy conversion, production of work from heat, thermodynamic analysis of processes, equilibrium stage operations and the thermodynamics of chemically reacting systems.

ENCH 333. CHEMICAL ENGINEERING SEMINAR. (1)
Prerequisite: Senior standing. Oral and written reports on recent developments in chemical engineering and the process industries.

ENCH 425. TRANSFER AND TRANSPORT PROCESSES I. (4)
Prerequisite: ENCH 250. Theory and applications of molecular and turbulent transport phenomena. Principles of fluid mechanics, mass transfer and heat transfer. Dimensional analysis, analogy between heat, mass and momentum transfer, Newtonian and non-Newtonian flow, convective heat and mass transfer.

ENCH 427. TRANSFER AND TRANSPORT PROCESSES II. (3)
Prerequisite: ENCH 425. Steady and unsteady state diffusion and conduction, simultaneous heat and mass transfer, interphase transfer, boundary layer theory. Application to absorption, adsorption, extraction and distillation. Principles of radiant heat transfer, evaporation, filtration, crystallization, drying, condensation, boiling humidification, ion exchange, and phase separations.

ENCH 437. CHEMICAL ENGINEERING LABORATORY. (3)
Prerequisite: ENCH 427. Application of chemical engineering process and unit operation principles in small scale semi-commercial equipment. Data from experimental observations are used to evaluate performance and efficiency of operations. Emphasis is placed on correct presentation of results in report form.

ENCH 440. CHEMICAL ENGINEERING KINETICS. (3)
Prerequisite: ENCH 250. Fundamentals of chemical reaction kinetics and their application to the design and operation of chemical reactors. Reaction rate theory, homogeneous reactions in batch and flow systems, adsorption, heterogeneous reactions and catalysis electrochemical reactions. Catalytic reactor design.

ENCH 442. CHEMICAL ENGINEERING SYSTEMS ANALYSIS. (2)
Differential equations or ENCH 453. Dynamic response applied to process systems. Goals and modes of control, Laplace Transformations, analysis and synthesis of simple control systems, closed loop response, dynamic testing.

ENCH 443. DYNAMICS AND CONTROL LABORATORY. (1)
Corequisite: ENCH 442. Methods of process control. Use of experimental analog and mathematical models of control systems.

ENCH 445. PROCESS ENGINEERING AND DESIGN. (3)
Prerequisite: ENCH 427. Utilization of chemical engineering principles for the design of process equipment. Typical problems in the design of chemical plants. Comprehensive reports are required.

ENCH 447. CHEMICAL ENGINEERING ECONOMICS. (2)
Prerequisite: ENCH 427. Principles of engineering economics applied to chemical processes. Determination of investment and operating costs for chemical plants.

ENCH 450. CHEMICAL PROCESS DEVELOPMENT. (3)
Prerequisite: ENCH 427. Chemical process industries from the standpoint of technology, raw materials, products and processing equipment. Operations of major chemical processes and industries combined with quantitative analysis of process requirements and yields.

ENCH 452. ADVANCED CHEMICAL ENGINEERING ANALYSIS. (3)
Prerequisite: ENCH 425. Application of digital and analog computers to chemical engineering problems. Numerical methods, programming, differential equations, curve fitting, amplifiers and analog circuits.

ENCH 453. APPLIED MATHEMATICS IN CHEMICAL ENGINEERING. (3)
Prerequisite: MATH 240. Mathematical techniques applied to the analysis and solution of chemical engineering problems. Use of differentiation, integration, differential equations, partial differential equations and integral transforms. Application of infinite series, numerical and statistical methods.

ENCH 454. CHEMICAL PROCESS ANALYSIS AND OPTIMIZATION. (3)
Prerequisites: ENCH 427, 440. Applications of mathematical models to the analysis and optimization of chemical processes. Models based on transport, chemical kinetics and other chemical engineering principles will be employed. Emphasis on evaluation of process alternatives.

ENCH 455. CHEMICAL PROCESS LABORATORY. (2)
Prerequisites: ENCH 427 and 440. Experimental study of various chemical processes through laboratory and small semi-commercial scale equipment. Reaction kinetics, fluid mechanics, heat and mass transfer.

ENCH 461. CONTROL OF AIR POLLUTION SOURCES. (3)
Prerequisite: Senior standing in engineering or consent of instructor. Theory and application of methods for the control and removal of airborne materials. Principles

of design and performance of air quality control equipment.

ENCH 468. RESEARCH. (2-3)
Prerequisite: Permission of the staff. Investigation of a research project under the direction of one of the staff members. Comprehensive reports are required.

ENCH 475. ELECTROCHEMICAL ENGINEERING. (3)
Prerequisite: ENCH 425. Fundamentals of electrochemistry with application to engineering and commercial processes. Equilibrium potentials, reaction mechanisms, cell kinetics, polarization, surface phenomena. Electrorefining, electrowinning, oxidation and reduction, solid, liquid and gas systems. Aspects of design and performance of electroprocess plants.

ENCH 480. ENGINEERING ANALYSIS OF PHYSIOLOGICAL SYSTEMS. (3)
Engineering description and analysis of physiological systems. Survey of bioengineering literature and an introduction to mathematical modeling of physiological systems.

ENCH 482. BIOCHEMICAL ENGINEERING. (3)
Prerequisite: Senior standing in engineering or consent of instructor. Introduction to biochemical and microbiological applications to commercial and engineering processes, including industrial fermentation, enzymology, ultrafiltration, food and pharmaceutical processing and resulting waste treatment. Enzyme kinetics, cell growth, energetics and mass transfer.

ENCH 490. INTRODUCTION TO POLYMER SCIENCE. (3)
Prerequisite: Consent of instructor. The elements of the chemistry, physics, processing methods, and engineering applications of polymers.

ENCH 492. APPLIED PHYSICAL CHEMISTRY OF POLYMERS. (3)
Prerequisite: CHEM 481. Corequisite: CHEM 482 or consent of instructor. Kinetics of formation of high polymers, determination of molecular weight and structure, and applied thermodynamics and phase equilibria of polymer solutions.

ENCH 494. POLYMER TECHNOLOGY LABORATORY. (3)
One lecture and two lab periods per week. Prerequisite: ENCH 492 or consent of instructor. Measurement of mechanical, electrical, optical, thermal properties of polymers. Measurement of molecular weight by viscosimetry, isometric and light scattering methods. Application of x-ray, NMR, ESR, spectroscopy, molecular relation, microscopy and electron microscopy to the determination of polymer structure. Effects of ultraviolet light and high energy radiation.

ENGINEERING-COOPERATIVE EDUCATION

ENCO 308. CO-OP INTERNSHIP. (0)
Professional internship in industry or government agency provides the practical work experiences which supplement and enhance the theories, principles and practices in the normal educational program. The student should register for ENCO 308 for each summer internship. He should register for both ENCO 308 and ENCO 309 for each semester internship.

ENCO 309. CO-OP INTERNSHIP. (0)
Professional internship in industry or government agency provides the practical work experiences which supplement and enhance the theories, principles and practices in the normal educational program. The student should register for ENCO 308 for each summer internship. He should register for both ENCO 308 and ENCO 309 for each semester internship.

ENGINEERING, ELECTRICAL

ENEE 204. SYSTEMS AND CIRCUITS I. (3)
Prerequisite: MATH 141. Required of sophomores in electrical engineering. Kirchhoff's laws, linear, non-linear, and time-varying elements of systems and circuits. Solution of circuit differential equations, zero input, zero state, and complete response. Sinusoidal analysis in the steady state. Concept of impedance and network function; node and mesh analysis by phasor methods. Coupled elements, ideal transformers, controlled sources.

ENEE 250. COMPUTER STRUCTURES. (3)
Prerequisite: ENES 243 or equivalent. Required of sophomores in electrical engineering. Basic structure and organization of digital computers; number systems and data representation; assembly language (some simple assembly language programs will be run), introduction to system software; gates and memory elements; logic design of simple digital systems; reliability; hardware/software tradeoffs.

ENEE 300, 302. PRINCIPLES OF ELECTRICAL ENGINEERING. (3, 3)
Prerequisites: MATH 241, PHYSICS 263. Corequisites: ENEE 301, 303. Required of aerospace, mechanical (ENEE 300 only) and chemical engineers. Not applicable in the electrical engineering major program. These courses are acceptable as prerequisites for some advanced ENEE courses. ENEE 300 includes analysis of linear systems, introduction to Laplace Transforms, steady-state A-C transforms, introduction to the concepts of electromagnetic fields and electric machines. ENEE 302 includes principles and circuit applications of semi-conductor devices and electron tubes.

ENEE 301, 303. ELECTRICAL ENGINEERING LABORATORY. (1, 1)
Two hours of laboratory per week. Corequisites: ENEE 300 (for ENEE 301) and ENEE 302 (for ENEE 303). Required of aerospace, mechanical (ENEE 301 only), and chemical engineers. Experiments on the transient and steady-state response of linear circuits, electric machines, electron tubes and semi-conductor devices.

ENEE 304. SYSTEMS AND CIRCUITS II. (3)
Prerequisite: ENEE 204; corequisite: MATH 246. Required of juniors in electrical engineering. Elementary graph theory and topological concepts, network theorems. General node and mesh analysis, state equations. Analysis by LaPlace transform; network functions, Fourier series. Two-port theory; small-signal analysis of semiconductor devices; various parameter matrices.

ENEE 305. FUNDAMENTAL LABORATORY. (2)
Corequisite: ENEE 204. Required of juniors in electrical engineering. One lecture and three lab hours per week. Concepts and techniques of physical measurements using standard electrical measuring devices: Generators, oscilloscopes, voltmeters, etc. Measurements of linear and non-linear circuits; steady-state and step response; integrated circuits. Handling and use of data.

ENEE 314. ELECTRONIC CIRCUITS. (3)
Prerequisite: ENEE 304. Required of electrical engineering majors. Characteristics of semiconductor devices. Diodes; biasing and stabilization of bipolar and field effect transistors; power amplifiers; small signal analysis and transistor amplifier characteristics. Feedback amplifiers, integrated operational amplifiers; transistor switches, gates and integrated logic circuits; bistable miltivibrators and applications in counters, registers and selected digital networks.

ENEE 320. ENGINEERING PROBABILITY. (3)
Prerequisites: MATH 241 and ENEE 204. Required of electrical engineering majors. Axioms of probability; conditional probability and Bayes' Rules; random variables, probability distribution and densities; functions of random variables; weak law of large numbers and central limit theorem. Introduction to random processes; correlation functions, spectral densities, and linear systems. Applications to noise in electrical systems, filtering of signals from noise, estimation, and digital communications.

ENEE 322. SIGNAL AND SYSTEM THEORY. (3)
Prerequisite: ENEE 320. Required of electrical engineering majors. Concept of linear system, state space equations for lumped linear systems, time domain analysis of discrete and continuous linear systems, Fourier series, Fourier and LaPlace transforms, Z transforms, stationary random signals. Application of theory to problems in electrical engineering.

ENEE 380. ELECTROMAGNETIC THEORY. (3)
Prerequisites: MATH 241, PHYS 263. Required of juniors in electrical engineering. Introduction to electro-magnetic fields. Coulomb's law, Gauss's law, electrical potential, dielectric materials, capacitance, boundary value problems, Biot-Savart law, Ampere's law, Lorentz force equation, magnetic materials, magnetic circuits, inductance, time varying fields and Maxwell's equations.

ENEE 381. ELECTROMAGNETIC WAVE PROPAGATION. (3)
Prerequisite: ENEE 380. Required of electrical engineering majors. Review of Maxwell's equations; the wave equation, potentials, Poynting's theorem. Transmission, lossy medium, skin effect. Parallelplate and rectangular wave-guides. Radiation, retarded potentials, radiation from dipole.

ENEE 402. ADVANCED PULSE TECHNIQUES. (3)
(See ENEE 403 for related laboratory course). Prerequisite: ENEE 314 or ENEE 410 or equivalent. Bistable, monostable, and astable circuits, sweep circuits, synchronization, counting, gates, comparators. Magnetic core circuits, semiconductor and vacuum-tube circuits.

ENEE 403. PULSE TECHNIQUES LABORATORY. (1)
Two hours of laboratory per week. Corequisite: ENEE 402 and permission of the instructor. Experiments on switching circuits, bistable, monostable, and astable circuits, sweep circuits, gates, comparators.

ENEE 404. RADIO ENGINEERING. (3)
Prerequisite: ENEE 314. Tuned circuit amplifiers, single, double, and stagger tuned circuits; class C amplifiers; frequency multipliers; amplitude modulation; modulators and detectors; receiver design and characteristics; frequency modulation; FM transmitters and receivers.

ENEE 405. ADVANCED RADIO ENGINEERING LABORATORY. (1)
Two hours of laboratory per week. Corequisite: ENEE 404. Experiments on multiple tuned amplifiers, noise figure measurements, class-C amplifiers, varactors, modulators, projects.

ENEE 406. MATHEMATICAL FOUNDATIONS OF CIRCUIT THEORY. (3)
Prerequisites: ENEE 304 and MATH 241, or equivalent. Review of determinants, linear equations, matrix theory, eigenvalues, theory of complex variables, inverse LaPlace transforms. Applications are drawn primarily from circuit analysis.

ENEE 410. ELECTRONIC CIRCUITS. (3)
Prerequisite: ENEE 300 or equivalent knowledge of circuit theory or consent of the instructor. This course is intended for students in the physical sciences, and for engineering students requiring additional study of electron circuits. Credit not normally given for this course in an electrical engineering major program. (ENEE 413 may optionally be taken as an associated laboratory). P-n junctions, transistors, vacuum tubes, biasing and operating point stability, switches, large-signal analysis, models, small-signal analysis, frequency response, feedback and multistage amplifiers, pulse and digital circuits.

ENEE 412. TELEMETRY SYSTEMS. (3)
Prerequisite: ENEE 314. Selected digital circuits; frequency division multiplexing; FM/AM systems. SSB/FM systems; time division multiplexed systems; pulse amplitude modulation; pulse duration modulation; pulse code modulation; analog to digital converters; multiplexers and DC-commutators.

ENEE 413. ELECTRONICS LABORATORY. (2)
Specialty Elective Laboratory. Prerequisite: ENEE 305. 1 lecture and 3 lab hours per week. Provides experience in the specification, design, and testing of basic electronic circuits and practical interconnections. Emphasis on design with discrete solid state and integrated circuit components for both analog and pulse circuits.

ENEE 414. NETWORK ANALYSIS. (3)
Specialty Elective Course. Prerequisite: ENEE 304. Network properties: Linearity, reciprocity, etc.; 2-port descriptions and generalization: Y, S, hybrid matrices; description properties: Symmetry, para-unitary, etc.; basic topological analysis; state-space techniques; computer-aided analysis; sensitivity analysis; approximation theory.

ENEE 416. NETWORK SYNTHESIS. (3)
Specialty Elective Course. Prerequisite: ENEE 414. Active and passive components, passivity, bounded and positive real, RC properties and synthesis, Brune and Darlington synthesis, transfer-voltage and Y_{21} synthesis, active feedback configurations, image parameter design, computer-aided optimization, synthesis via the embedding concept.

ENEE 417. ADVANCED NETWORK THEORY. (3)
Corequisite: ENEE 414 (or consent of instructor). A study of network descriptions for analysis and basic active synthesis. Indefinite and topological formulations, n-port structures and interconnections, active components and descriptions, synthesis using controlled sources, synthesis and analysis via state characterizations. Additional topics from non-linear, distributed parameter, and digital filters.

ENEE 418A. PROJECTS IN ELECTRICAL ENGINEERING. (1-3)
Hours to be arranged. Prerequisites: Senior standing and permission of the instructor. May be taken for repeated credit up to a total of 4 credits, with the permission of the student's advisor and the instructor. Theoretical and experimental projects.

ENEE 418B. APPRENTICESHIP. (2-3)
Hours to be arranged. Prerequisite: Completion of all sophomore courses and permission of an apprenticeship director. Present areas of apprenticeship are: Biomedical, Gas Lasers, Solid State Lasers, Simulation and Computers, Integrated Circuits, Electron Ring Accelerator Project, Charged Particle Laboratory. May be taken for repeated credit up to a total of nine credits.

ENEE 420. COMMUNICATION THEORY. (3)
Specialty Elective Course. Prerequisite: ENEE 320. Random signals: elements of random processes, noise, Gaussian process, correlation functions and power spectra, linear operations; optimum receivers, vector waveform channels, receiver implementation, probability of error performance; efficient signaling: sources, encoding, dimensionality, channel capacity; wave form communication: linear, angle, and pulse modulation.

ENEE 421. INTRODUCTION TO INFORMATION THEORY. (3)
Specialty Elective Course. Prerequisite: ENEE 320. Definition of information and entropy; characterization of sources; Kraft and MacMillan inequalities; coding information sources; noiseless coding theorem; channels and mutual information; Shannon's coding theorem for noisy channels.

ENEE 425. SIGNAL ANALYSIS, MODULATION AND NOISE. (3)
Prerequisites: ENEE 314 and ENEE 320. Signal transmission through networks, transmission in the presence of noise, statistical methods of determining error and transmission effects, modulation schemes.

ENEE 432. ELECTRONICS FOR LIFE SCIENTISTS. (3)
Three hours of lecture and two hours of laboratory per week. Prerequisites: College algebra and a physics

course, including basic electricity and magnetism. Not accepted for credit in an electrical engineering major program. The concept of an instrumentation system with emphasis upon requirements for transducers, amplifiers, and recording devices, design criteria and circuitry of power supplies amplifiers, and pulse equipment, specific instruments used for biological research, problems of shielding against hum and noise pickup and other interference problems characteristic of biological systems.

ENEE 433. ELECTRONIC INSTRUMENTATION FOR PHYSICAL SCIENCE. (3)
Two hours of lecture and two hours of laboratory per week. Prerequisites: ENEE 300 or 306, PHYSICS 271 or equivalent, or consent of instructor. The concept of instrumentation systems from sensor to readout; discussions of transducers, system dynamics, precision and accuracy; measurement of electrical parameters; direct, differential, and potentiometric measurements; bridge measurements, time and frequency measurements, waveform generation and display.

ENEE 434. INTRODUCTION TO ELECTRICAL PROCESSES IN BIOLOGY AND MEDICINE I. (3)
Specialty Elective Course. Prerequisite: ENEE 300 or equivalent. Introduction in the generation and processing of bioelectric signals including structure and function of the neuron, neuron models, membrane theory, generation and propagation of nerve impulses, synaptic mechanisms transduction and neural coding and sensory events, central nervous system processing of sensory information and correlated electrical signals, control of effector organs, muscle contraction and mechanics, and analytical and instrumental techniques of nerve signal processing.

ENEE 435. INTRODUCTION TO ELECTRICAL PROCESSES IN BIOLOGY AND MEDICINE II. (3)
Specialty elective course. Prerequisite: ENEE 434. Emphasis on the experimental and analytical methods necessary to elucidate peripheral and central nervous system function, activity and information processing; acquisition and analysis of electrocardiograms; electromyograms and electroencephalograms.

ENEE 440. DIGITAL COMPUTER ORGANIZATION. (3)
Prerequisite: ENES 243 or CMSC 210 or equivalent. Same as CMSC 410. Introduction; computer elements; parallel adders and subtracters; micro-operations; sequences; computer simulation; organization of a commercially available stored program computer; microprogrammed computers; a large-scale batch-processing system (optional). (Intended for those minoring in computers and for those majoring in Computer Science).

ENEE 442. INTRODUCTION TO COMPUTER-AIDED ANALYSIS AND DESIGN. (3)
Prerequisites: ENES 243, ENEE 314. Application of digital computers to solutions of lumped parameter system problems; use of simulators; economic and reliability considerations; investigation and applications of problem oriented programs such as those for circuit analysis, (e.g. CORNAP, JOBSHOP, ECAP, and NASAP.) The use of the computer will be an integral part of the course.

ENEE 443. INTRODUCTION TO COMPUTERS AND COMPUTATION. (3)
Prerequisite: ENES 243 or equivalent. Basic structure and organization of digital systems; representation of data, introduction to software systems; assembly language; application of computers in engineering and physical systems. Not open for students who have credit in ENEE 250.

ENEE 444. LOGIC DESIGN OF DIGITAL SYSTEMS. (3)
Specialty Elective Course. Prerequisite: ENEE 250. Review of switching algebra; gates and logic modules; map simplification techniques; multiple-output systems; memory elements and sequential systems; large switching systems; iterative networks; sample designs, computer oriented simplification algorithms; state assignment; partition techniques; sequential system decompositions.

ENEE 445. COMPUTER LABORATORY. (2)
Specialty Elective Laboratory. Prerequisite: ENEE 305, corequisite: ENEE 444. 1 lecture and 3 lab hours per week. Hardware oriented experiments providing practical experience in the design, construction, and checkout of components and interfaces for digital computers and data transmission systems. Projects include classical design techniques and applications of current technology.

ENEE 446. COMPUTER ARCHITECTURE: (3)
Specialty elective course. Prerequisite: ENEE 444. Digital computer organization; arithmetic hardware; primary and secondary storage organization; read-only and associative memories; introduction to multi-processor and multi-programming computer systems; interaction of hardware and software.

ENEE 450. INTRODUCTION TO DISCRETE STRUCTURES. (3)
Prerequisite: ENES 243 or equivalent. This is the same course as CMSC 340. Review of set algebra including relations, partial ordering and mappings. Algebraic structures including semigroups and groups. Graph theory including trees and weighted graphs. Boolean algebra and propositional logic. Applications of these structures to various areas of computer science and computer engineering.

ENEE 451. INTRODUCTION TO AUTOMATA THEORY. (3)
Prerequisite: ENEE 450 or permission of the instructor. An introduction to finite state machines and their properties; properties of regular sets; elementary decomposition results; introduction to Turing machines and computability theory; undecidability propositions; introduction to finite semigroups with application to the decomposition of finite state machines.

ENEE 456. ANALOG AND HYBRID COMPUTERS. (3)
Prerequisite: ENEE 314. Programming the analog computer; analog computing components; error analysis, repetitive operation; synthesis of systems using the computer; hybrid computer systems.

ENEE 460. INTRODUCTION TO CONTROL I. (3)
Specialty Elective Course. Prerequisite: ENEE 322. Review of transform analysis and linear algebra, mathematical models for control system components, transient response design, error analysis and design, root locus, frequency response, system design and compensation.

ENEE 461. CONTROL SYSTEMS LABORATORY. (2)
Specialty Elective Laboratory. Prerequisite: ENEE 305. 1 lecture and 3 lab hours per week. Projects to enhance the student's understanding of feedback control systems and to familiarize him with the characteristics and limitations of real control devices. Students will design, build, and test servomechanisms, and will conduct analog and hybrid computer simulations of control systems.

ENEE 462. INTRODUCTION TO CONTROL II. (3)
Specialty Elective Course. Prerequisite: ENEE 460 or consent of instructor. Mathematical background, state space analysis, phase plane methods, discrete-time systems, controllability and observability, realization theory, computation and simulation.

ENEE 464. LINEAR SYSTEM THEORY. (3)
Prerequisite: ENEE 322. An introduction to the state space theory of linear engineering systems; state variables, Matrix exponential and impulse response. Linear sampled-data systems, discrete systems. Reliability, stability and equivalence. Relation to LaPlace transform. Application to circuits, controls, communications and computers.

ENEE 472. TRANSDUCERS AND ELECTRICAL MACHINERY. (3)
Prerequisite: ENEE 304. Electromechanical transducers.

theory of electromechanical systems, power and wide-band transformers, rotating electrical machinery from the theoretical and performance points of view.

ENEE 473. TRANSDUCERS AND ELECTRICAL MACHINERY LABORATORY. (1)
Corequisite: ENEE 472. Experiments on transformers, synchronous machines, induction motors, synchros, loudspeakers, other transducers.

ENEE 480. ELECTROMAGNETIC PROPERTIES OF MATERIALS. (3)
Specialty Elective Course. Prerequisite. ENEE 381. Review of Maxwell's equations, the wave equation; electron dynamics with applications to accelerators; dielectrics; the dielectric model for plasmas, plane waves in magnetoplasmas; introduction to quantum mechanics and quantum statistics; theory of semi-conductors; ferromagnetism and selected topics.

ENEE 481. ANTENNAS. (3)
Specialty Elective Course. Prerequisite: ENEE 381. Introduction to the concepts of radiation, generalized far field formulas; antenna theorems and fundamentals; antenna arrays, linear and planar arrays; Aperture antennas; Terminal impedance; Propagation.

ENEE 483. ELECTROMAGNETIC MEASUREMENTS LABORATORY. (2)
Specialty Elective Laboratory. Prerequisites: ENEE 305 and ENEE 380. 1 lecture and 3 lab hours per week. Experiments designed to provide familiarity with a large class of micro-wave and optical components, techniques for interconnecting them into useful systems, and techniques of high frequency and optical measurements.

ENEE 487. PARTICLE ACCELERATORS, PHYSICAL AND ENGINEERING PRINCIPLES. (3)
Three hours of lecture per week. Prerequisites: ENEE 380, and PHYS 420, or consent of the instructor. Sources of charged particles; methods of acceleration and focusing of ion beams in electromagnetic fields; basic theory, design, and engineering principles of particle accelerators.

ENEE 488. TOPICS IN ELECTRICAL ENGINEERING. (3)
Prerequisite: Permission of the instructor. May be taken for repeated credit up to a total of 6 credits, with the permission of the student's advisor and the instructor.

ENEE 496. PHYSICAL ELECTRONICS OF DEVICES. (3)
Three hours of lecture per week. Prerequisite: PHYS 420 and ENEE 480. Introduction to electron and ion optics. Principles of vacuum tubes, klystrons and magnetrons. Conductivity of metals and semiconductors. P-n junction and transistors.

ENGINEERING SCIENCES

ENES 101. INTRODUCTORY ENGINEERING SCIENCE. (3)
One lecture and two laboratory periods a week. Basic languages of the engineer. Elements of graphic communication and analysis. Orthographic projection and descriptive geometry, conventions, graphs and curve-fitting. Application of geometry to engineering problems.

ENES 110. MECHANICS. (3)
Two lectures and two drill periods a week. Prerequisites: ENES 101, and concurrent registration in MATH 140 or approval of department chairman. Systems of rigid bodies in equilibrium under action of forces and couples. Numerical, graphical, and vectoral computation applied to problems in statics and elementary dynamics.

ENES 220. MECHANICS OF MATERIALS. (3)
Three lectures a week. Prerequisites: MATH 141, PHYS 161, and ENES 110. Distortion of engineering materials in relation to changes in stress or temperature. Geometry of internal strain and external displacement. Application to beams, columns, shafts, tanks, and other structural, machine and vehicle members.

ENES 221. DYNAMICS. (3)
Three lectures a week. Prerequisites: ENES 110, and concurrent registration in MATH 240 and PHYS 262. Systems of heavy particules and rigid bodies at rest and in motion. Force-acceleration, work-energy and impulse-momentum relationships. Motion of one body relative to another in a plane and in space.

ENES 230. MATERIALS SCIENCE. (3)
Three lectures a week. Prerequisite: ENES 220. Basic principles, nature, and properties of engineering materials. Structure of matter, phase transformations and mechanical properties of metals, ceramics, polymers and related materials, electrical, thermal and magnetic properties, corrosion and radiation damage, friction and wear, diffusion.

ENES 240. ALGORITHMIC ANALYSIS AND COMPUTER PROGRAMMING. (2)
One hour of lecture and two hours of laboratory per week. Corequisite: MATH 240. Required of sophomores in electrical engineering. Concept and properties of algorithms (fully defined procedures for solving problems), problems from numerical mathematics, use of specific algorithmic language (MAD), completion of several projects using a digital computer.

ENES 243. DIGITAL COMPUTER LABORATORY. (1)
Two hours of laboratory per week. Prerequisite: ENES 240. Required of sophomores in electrical engineering. Completion of several projects in numerical mathematics on a digital computer, with emphasis of efficiency of computation accuracy of approximations and control of errors.

ENES 301. POWER AND THE ENVIRONMENT. (3)
Prerequisite: Junior standing or consent of the instructor. An introduction to the power needs of society. The interrelationship between man's use of energy and the effect on the eco-system. Introduction to the techniques of power production with special emphasis on nuclear fueled power plants.

ENES 401. TECHNOLOGICAL ASSESSMENT. (3)
Prerequisite: Senior standing or consent of instructor. Analysis of assessing technology in terms of goals and resources. Public and private constraints, changes in objectives and organization. Applications to chemical and nuclear technology.

ENES 473. PRINCIPLES OF HIGHWAY AND TRAFFIC ENGINEERING. (3)
Prerequisite: Permission of instructor. This course is designed to assist the non-engineer in understanding highway transportation systems. A survey of the fundamentals of traffic characteristics and operations. Study of the methods and implementation of traffic control and regulation. An examination of highway design procedures, and the role of traffic engineering in transportation systems safety improvements.

ENGINEERING—FIRE PROTECTION

ENFP 251. FIRE PROTECTION ENGINEERING. (1)
One lecture a week. Dimensions of the fire problem, economic, environmental, social, fire protection engineering aspects of other disciplines. Introduction to fire research and development.

ENFP 280. URBAN FIRE PROBLEM ANALYSIS. (3)
Two lectures and one laboratory period a week. Intensive study of the urban fire problem. Operation research techniques, and systems engineering are utilized as analytic procedures for the technological assessment of public fire protection. Traditional assessment methods and urban analysis.

ENFP 290. IGNITION AND COMBUSTION PHENOMENON. (2)
One lecture and one laboratory period a week. Examination of fuel phases as related to unregulated diffusion flame combustion. Classical theories of combustion re-

lated to fire and explosion experience. Detailed examination of the basic fire phenomenon.

ENFP 310. FIRE PROTECTION SYSTEMS DESIGN. (3)
Two lectures and one laboratory period a week. Prerequisite: ENFP 290. An examination of specifications, code criteria, and published standards utilized in the engineering design of fire suppression systems, emergency communication systems, and hazard detection systems. A concentrated study of design layout procedures for aqueous, gaseous, and particle suppression systems. A foundation course for the advanced systems calculation course—ENFP 415.—Fire Protection Fuilds II.

ENFP 312. FIRE PROTECTION FLUIDS I. (3)
Two lectures and one laboratory period a week. Corequisite: ENCE 330. A study of hydrostatic and hydrodynamic problems associated with municipal and industrial water supply distribution systems. Calculation methods, techniques and procedures for hydraulically designed distribution networks to meet prescribed conditions of adequacy and reliability of the total systems.

ENFP 320. PYROMETRICS OF MATERIALS. (3)
Two lectures and one laboratory period a week. Analysis and study of characteristics of materials, and material assemblies related to flame spread, fuel contribution, combustility, and smoke development. Analysis of fuel geometry and configuration to fire severity. Procedures of laboratory analysis, determination and modeling are examined.

ENFP 321. FUNCTIONAL AND STRUCTURAL EVALUATION. (3)
Two lectures and one laboratory period a week. Prerequisite: ENFP 320. Examination of the functional and structural components of buildings and building complexes relative to modular fire loss potential. Analytic concepts and research developments are related to modular loss evaluations. Investigation of the performance criteria of building and fire prevention codes.

ENFP 411. SYSTEMS APPROACH TO FIRE PROTECTION DESIGN. (3)
Two lectures and one laboratory period a week. Prerequisite: Senior standing. Examination of the problem areas associated with manufacturing, process, laboratory, and transportation systems. Design projects will involve the total application of fire protection engineering, with economic and cost benefit analysis.

ENFP 414. LIFE SAFETY ANALYSIS. (3)
Two lectures and one laboratory period a week. Prerequisite: ENFP 321. Detailed examination and study of the physical and psychological variables related to the occurrence of casualties. Investigation of functional features of enclosures relative to egress, and smoke and gas fluid floww. Examination and analysis procedures.

ENFP 415. FIRE PROTECTION FLUIDS II. (3)
Two lectures and one laboratory period a week. Prerequisite: ENFP 310, 312. The application of hydraulic and fluid theory to design calculations for aqueous, gaseous and particle fire suppression systems. Problem calculation projects based upon design layouts developed in ENFP 310.

ENFP 416. PROBLEM SYNTHESIS AND DESIGN. (3)
Two lectures and one laboratory period a week. Prerequisite: Senior standing. Techniques and procedures of problem orientation and solution design utilizing logical and numerical procedures. Student development of research projects in selected areas.

ENGLISH

ENGL 101. INTRODUCTION TO WRITING. (3)
An introductory course in expository writing.

ENGL 102. INTRODUCTION TO LITERATURE. (3)

ENGL 171. HONORS COMPOSITION. (3)
Survey of principles of composition, rhetoric, and techniques of research; reading in essays, short stories, poetry; frequent themes.

ENGL 201. WORLD LITERATURE. (3)
Homer to the Renaissance, foreign classics being read in translation.

ENGL 202. WORLD LITERATURE. (3)
Shakespeare to the present, foreign classics being read in translation.

ENGL 211. ENGLISH LITERATURE FROM THE BEGINNINGS TO 1800. (3)

ENGL 212. ENGLISH LITERATURE FROM 1800 TO THE PRESENT. (3)

ENGL 221. AMERICAN LITERATURE—BEGINNING TO 1865. (3)

ENGL 222. AMERICAN LITERATURE—1865 TO PRESENT. (3)

ENGL 241. INTRODUCTION TO THE NOVEL. (3)

ENGL 242. READINGS IN BIOGRAPHY. (3)
An analytical study in the form and technique of biographical writing in Europe and America.

ENGL 243. INTRODUCTION TO POETRY AND POETICS. (3)

ENGL 244. INTRODUCTION TO DRAMATIC LITERATURE. (3)
A survey of the basic literature of drama from the classical Greeks to modern times.

ENGL 245. INTRODUCTION TO FILM AS LITERATURE. (3)
Primary attention is on the film as a narrative medium, but other literary models will be examined.

ENGL 270. INTRODUCTION TO ENGLISH HONORS. (3)
Intensive study of a limited number of works drawn from five major genres (drama, narrative poetry, lyric poetry, prose fiction, prose non-fiction). An introduction for the beginning honors student to the major genres, literary backgrounds, chronological divisions and methods of approaching English and American literature. Required for graduation with honors.

ENGL 271. HONORS WORLD LITERATURE. (3)
Homer to the renaissance, foreign classics being read in translation.

ENGL 272. HONORS WORLD LITERATURE. (3)
Shakespeare to the present, foreign classics being read in translation.

ENGL 277. SPECIAL TOPICS IN LITERATURE. (3)

ENGL 280. INTRODUCTION TO LINGUISTICS. (3)
Listed also as LING 100 and ANTH 371.

ENGL 291. EXPOSITORY WRITING. (3)

ENGL 292. COMPOSITION AND LITERARY TYPES. (3)
Not open to students who have taken ENGL 171. A study of literary genres with writing based on readings.

ENGL 293. TECHNICAL WRITING. (3)

ENGL 294. INTRODUCTION TO CREATIVE WRITING. (3)
Additional prerequisite, sophomore standing.
The prerequisites for all 300 and 400 level ENGL courses are any two freshman or sophomore English courses, with the exception of ENGL 293 and ENGL 294.

ENGL 401. ENGLISH MEDIEVAL LITERATURE IN TRANSLATION. (3)

ENGL 402. CHAUCER. (3)

ENGL 403. SHAKESPEARE. (3)
Early period: histories and comedies.

ENGL 404. SHAKESPEARE. (3)
Late periods: tragedies and romances.

ENGL 405. THE MAJOR WORKS OF SHAKESPEARE. (3)
Students who have credit for ENGL 403 or 404 cannot receive credit for ENGL 405.

ENGL 407. LITERATURE OF THE RENAISSANCE. (3)

ENGL 410. EDMUND SPENSER. (3)

ENGL 411. LITERATURE OF THE RENAISSANCE. (3)

ENGL 412. LITERATURE OF THE SEVENTEENTH CENTURY, 1600-1660. (3)

ENGL 414. MILTON. (3)

ENGL 415. LITERATURE OF THE SEVENTEENTH CENTURY, 1660-1700. (3)

ENGL 416. LITERATURE OF THE EIGHTEENTH CENTURY. (3)
Age of Pope and Swift.

ENGL 417. LITERATURE OF THE EIGHTEENTH CENTURY. (3)
Age of Johnson and the preromantics.

ENGL 418. MAJOR BRITISH WRITERS. (3)
Two writers studied intensively each semester.

ENGL 419. MAJOR BRITISH WRITERS. (3)
Two writers studied intensively each semester.

ENGL 420. LITERATURE OF THE ROMANTIC PERIOD. (3)
First generation: Blake, Wordsworth, Coleridge, et. al.

ENGL 421. LITERATURE OF THE ROMANTIC PERIOD. (3)
Second generation: Keats, Shelly, Byron, et. al.

ENGL 422. LITERATURE OF THE VICTORIAN PERIOD. (3)
Early years.

ENGL 423. LITERATURE OF THE VICTORIAN PERIOD. (3)
Middle years.

ENGL 424. LATE VICTORIAN AND EDWARDIAN LITERATURE. (3)
A study of the literary movements and techniques which effected the transition from Victorian to modern literature.

ENGL 425. MODERN BRITISH LITERATURE. (3)
An historical survey of the major writers and literary movements in English prose and poetry since 1900.

ENGL 430. AMERICAN LITERATURE, BEGINNING TO 1810, THE COLONIAL AND FEDERAL PERIODS. (3)

ENGL 431. AMERICAN LITERATURE, 1810 TO 1865, THE AMERICAN RENAISSANCE. (3)

ENGL 432. AMERICAN LITERATURE, 1865 TO 1914, REALISM AND NATURALISH. (3)

ENGL 433. AMERICAN LITERATURE, 1914 TO THE PRESENT, THE MODERN PERIOD. (3)

ENGL 434. AMERICAN DRAMA. (3)

ENGL 435. AMERICAN POETRY—BEGINNING TO THE PRESENT. (3)

ENGL 436. THE LITERATURE OF AMERICAN DEMOCRACY. (3)

ENGL 437. CONTEMPORARY AMERICAN LITERATURE. (3)
A survey of the poetry, prose, and drama written in America in the last decade.

ENGL 438. MAJOR AMERICAN WRITERS. (3)
Two writers studied intensively each semester.

ENGL 439. MAJOR AMERICAN WRITERS. (3)
Two writers studied intensively each semester.

ENGL 440. THE NOVEL IN AMERICA TO 1910. (3)

ENGL 441. THE NOVEL IN AMERICA SINCE 1910. (3)

ENGL 442. LITERATURE OF THE SOUTH. (3)
A historical survey, from eighteenth-century beginnings to the present.

ENGL 443. AFRO-AMERICAN LITERATURE. (3)
An examination of the literary expression of the negro in the United States, from its beginning to the present.

ENGL 445. MODERN POETRY. (3)

ENGL 449. PLAYWRITING. (3)

ENGL 450. ELIZABETHAN AND JACOBEAN DRAMA. (3)
Beginnings to Marlowe.

ENGL 451. ELIZABETHAN AND JACOBEAN DRAMA. (3)
Johnson to Webster.

ENGL 452. ENGLISH DRAMA FROM 1660 TO 1800. (3)

ENGL 453. LITERARY CRITICISM. (3)

ENGL 454. MODERN DRAMA. (3)

ENGL 455. THE ENGLISH NOVEL. (3)
Eighteenth century.

ENGL 456. THE ENGLISH NOVEL. (3)
Nineteenth century.

ENGL 457. THE MODERN NOVEL. (3)

ENGL 460. INTRODUCTION TO FOLKLORE. (3)

ENGL 461. FOLK NARRATIVE. (3)
Studies in legend, tale and myth. Prerequisite: ENGL 460.

ENGL 462. FOLKSONG AND BALLAD. (3)
Prerequisite: ENGL 460.

ENGL 463. AMERICAN FOLKLORE. (3)
Prerequisite, ENGL 460. An examination of American folklore in terms of history and regional folk cultures. Exploration of collections of folklore from various areas to reveal the difference in regional and ethnic groups as witnessed in their oral and literary traditions.

ENGL 464. AFRO-AMERICAN FOLKLORE AND CULTURE. (3)
An examination of the culture of the Negro in the United States in terms of history (antebellum to the present) and social changes (rural to urban). Exploration of aspects of Negro culture and history via oral and literary traditions and life histories.

ENGL 465. URBAN FOLKLORE. (3)
Prerequisite, ENGL 460. An examination of the folklore currently originating in white, urban, American culture.

ENGL 470. HONORS CONFERENCE AND READING. (1)
Prerequisite: Candidacy for honors in English. Candidates will take ENGL 470 in their junior year and ENGL 471 in their senior year.

ENGL 471. HONORS CONFERENCE AND READING. (1)
Prerequisite: Candidacy for honors in English. Candidates will take ENGL 470 in their junior year and ENGL 471 in their senior year.

ENGL 472. INDEPENDENT RESEARCH IN ENGLISH. (1-3)
This course is designed to provide qualified majors in English an opportunity to pursue specific English readings under the supervision of a member of the department. Restricted to undergraduates.

ENGL 473. SENIOR PROSEMINAR IN LITERATURE. (3)
Open only to seniors. First semester. Required of candidates for honors and strongly recommended to those who plan to do graduate work. Individual reading assignments; term paper.

ENGL 479. SELECTED TOPICS IN ENGLISH AND AMERICAN LITERATURE. (3)

ENGL 481. INTRODUCTION TO ENGLISH GRAMMAR. (3)
A brief review of traditional English grammar and an introduction to structural grammar, including phonology, morphology and syntax.

ENGL 482. HISTORY OF THE ENGLISH LANGUAGE. (3)

ENGL 483. AMERICAN ENGLISH. (3)

ENGL 484. ADVANCED ENGLISH GRAMMAR. (3)
Credit may not be granted in both ENGL 484 and LING 402.

ENGL 485. ADVANCED ENGLISH STRUCTURE. (3)

ENGL 486. OLD ENGLISH. (3)

ENGL 493. ADVANCED EXPOSITORY WRITING. (3)

ENGL 498. CREATIVE WRITING. (3)

ENGL 499. ADVANCED CREATIVE WRITING. (3)

ENGINEERING MATERIALS

ENMA 462. DEFORMATION OF ENGINEERING MATERIALS. (3)
Prerequisites: ENES 230 or consent of instructor. Relationship of structure to the mechanical properties of materials. Elastic and plastic deformation, microscopic yield criteria, state of stress and ductility. Elements of

dislocation theory, work hardening, alloy strengthening, creep, and fracture in terms of dislocation theory.

ENMA 463. CHEMICAL, LIQUID AND POWDER PROCESSING OF ENGINEERING MATERIALS. (3)
Prerequisites: ENES 230 or consent of instructor. Methods and processes used in the production of primary metals. The detailed basic principles of beneficiation processes, pyrometallurgy, hydrometallurgy, electrometallurgy, vapor phase processing and electroplating. Liquid metal processing including casting, welding, brazing and soldering. Powder processing and sintering. Shapes and structures produced in the above processes.

ENMA 464. ENVIRONMENTAL EFFECTS ON ENGINEERING MATERIALS. (3)
Prerequisites: ENES 230 or consent of instructor. Introduction to the phenomena associated with the resistance of materials to damage under severe environmental conditions. Oxidation, corrosion, stress corrosion, corrosion fatigue and radiation damage are examined from the point of view of mechanism and influence on the properties of materials. Methods of corrosion protection and criteria for selection of materials for use in radiation environments.

ENMA 470. STRUCTURE AND PROPERTIES OF ENGINEERING MATERIALS. (3)
A comprehensive survey of the atomic and electronic structure of solids with emphasis on the relationship of structure to the physical and mechanical properties.

ENMA 471. PHYSICAL CHEMISTRY OF ENGINEERING MATERIALS. (3)
Equilibrium multicomponent systems and relationship to the phase diagram. Thermodynamics of polycrystalline and polyphase materials. Diffusion in solids, kinetics of reactions in solids.

ENMA 472. TECHNOLOGY OF ENGINEERING MATERIALS. (3)
Relationship of properties of solids to their engineering applications. Criteria for the choice of materials for electronic, mechanical and chemical properties. Particular emphasis on the relationships between structure of the solid and its potential engineering application.

ENMA 473. PROCESSING OF ENGINEERING MATERIALS. (3)
The effect of processing on the structure of engineering materials. Processes considered include refining, melting and solidification, purification by zone refining, vapor phase processing, mechanical working and heat treatments.

ENGINEERING, MECHANICAL

ENME 200. INTRODUCTION TO MECHANICAL ENGINEERING. (3)
Three lectures a week. Prerequisites: CHEM 104, MATH 141, and PHYS 161. Development of the student's capacity to solve engineering problems by the application of fundamental principles and fully defined procedures. Several projects require the use of a computer.

ENME 215. PRINCIPLES OF MECHANICAL ENGINEERING. (3)
Three lectures a week. Prerequisites: MATH 141, PHYS 263. Required of civil engineers. Laws and corollaries of classical thermodynamics. Properties and characteristics of pure substances and perfect gases, vapor and gas cycles. Mixture of gases including applications to psychrometry. Introduction to heat transfer.

ENME 216. THERMODYNAMICS I. (3)
Three lectures a week. Prerequisites: PHYSICS 262, MATH 141. Required of sophomores in mechanical and aeronautical engineering. Properties, characteristics and fundamental equation of gases and vapors. Application of first and second laws of thermodynamics in the analysis of basic heat engines, air compression and vapor cycles. Flow and non-flow processes for gases and vapors.

ENME 300. MATERIALS SCIENCE AND ENGINEERING. (3)
Three lectures a week. Prerequisite ENES 220. Basic principles nature and properties of engineering materials. Processes and methods to manufacture and usefully apply engineering materials. Fabrication techniques for metals, polymers, and refractories.

ENME 301. MATERIALS ENGINEERING LABORATORY. (1)
One laboratory a week. Laboratory to be taken concurrently with ENME 300. Fatigue, tensile and impact testing, heat treatment and hardenability, structure and properties of steels. Case studies.

ENME 320. THERMODYNAMICS. (3)
Three lectures a week. Prerequisites: MATH 141, PHYS 262. The properties, characteristics and fundamental equations of gases and vapors. Application of the first and second laws of thermodynamics in the analysis of basic heat engines, air compression and vapor cycles. Flow and non-flow processes for gases and vapors.

ENME 321. TRANSFER PROCESSES. (3)
Three lectures a week. Prerequisite: ENME 342. Conduction by steady state and variable heat flow, laminar and turbulent flow, free and forced convection, radiation, evaporation and condensation of vapors. Transfer of mass, heat, and momentum.

ENME 341. GAS DYNAMICS. (3)
Three lectures a week. Prerequisite: ENME 342. Compressible flow in ducts and nozzles, effect of area change, heat addition, friction, and normal shocks. Thermodynamics of chemically reacting flows, combustion and equilibrium.

ENME 342. FLUID MECHANICS I. (3)
Three lectures a week. Prerequisite: ENME 216. Fluid flow concepts and basic equations effects of viscosity and compressibility. Dimensional analysis and laws of similarity. Flow through pipes and over immersed bodies. Principles of flow measurement.

ENME 343. FLUID MECHANICS LABORATORY. (1)
One laboratory a week. Laboratory to be taken concurrently with ENME 342. Measurement of fluid properties, determination of pressure drops in pipes and fittings, observation of fluid phenomena. Experiment and demonstration of flow measurement techniques.

ENME 360. DYNAMICS OF MACHINERY. (3)
Three lectures a week. Prerequisites: ENES 221, ENME 380 concurrently. Dynamic characteristics of machinery with emphasis on systems with single and multiple degree of freedom.

ENME 380. APPLIED MATHEMATICS IN ENGINEERING. (3)
Prerequisite: MATH 141. Mathematical techniques applied to the analyses and solution of engineering problems. Use of differentiation, integration, differential equations, partial differential equations and integral transforms. Application of infinite series, numerical and statistical methods.

ENME 381. MEASUREMENTS LABORATORY. (3)
Two lectures and one laboratory period a week. Prerequisites: ENME 360 and ENEE 300. Concurrently, ENME 342. Required of juniors in mechanical engineering. Measurements and measurement systems, application of selected instruments with emphasis on interpretation of results.

ENME 382. ENGINEERING ANALYSIS AND COMPUTER PROGRAMMING. (3)
Three lectures a week. Prerequisites: MATH 246 or ENME 380. Elements of operational calculus, vector analysis, numerical methods and programming for computers. Errors, interpolation series, integration, interaction and solution of equations.

ENME 400. MACHINE DESIGN. (3)
Two lectures and one laboratory period a week. Prerequisites: ENME 360, 300. Working stresses, stress concentration, stress analysis and repeated loadings. Design of machine elements. Kinematics of mechanisms.

ENME 401. MECHANICAL ENGINEERING ANALYSIS AND DESIGN. (4)
Two lectures and two laboratory periods per week. Prerequisite: Senior standing in mechanical engineering or consent of instructor. Engineering design practice as illustrated by discussion of selected case studies. Design projects involving the application of technology to the solution of industrial and community problems. Legal and ethical responsibility of the designer.

ENME 402. SELECTED TOPICS IN ENGINEERING DESIGN. (3)
Three lecture periods per week. Prerequisite: Senior standing in mechanical engineering or consent of instructor. Creativity and innovation in design. Generalized performance analysis, reliability and optimization as applied to the design of components and engineering systems. Use of computers in design. Design of multivariable systems.

ENME 403. AUTOMATIC CONTROLS. (3)
Three lectures per week. Prerequisite: ENEE 300, senior standing. Hydraulic, electrical, mechanical and pneumatic automatic control systems. Open and closed loops. Steady state and transient operation, stability criteria, linear and non-linear systems. LaPlace transforms.

ENME 410. OPERATIONS RESEARCH I. (3)
Three lectures a week. Prerequisite: Senior standing in mechanical engineering. Applications of linear programming, queuing model, theory of games and competitive models to engineering problems.

ENME 411. INTRODUCTION TO INDUSTRIAL ENGINEERING. (3)
Three lectures per week. Prerequisites: ENME 300 and ECON 205 or consent of instructor. This course is concerned with the design, improvement and installation of integrated systems of men, materials and equipment. Areas covered include industrial activities, plant layout and design, value analysis, engineering economics, quality and production control, methods engineering, industrial relations, etc.

ENME 420. ENERGY CONVERSION. (3)
Three lectures a week. Prerequisite: ENME 320. Required of seniors in electrical engineering. Chemical, heat, mechanical, nuclear and electrical energy conversion processes, cycles and systems. Direct conversion processes of fuel cells, thermionics and magnetohydromechanics.

ENME 421. ENERGY CONVERSION I. (3)
Three lectures a week. Prerequisites: ENME 321, ENME 342. Application of the principles of thermodynamics, fluid mechanics and heat transfer to chemical, thermal, mechanical, nuclear and electrical energy conversion processes, cycles and systems. Reciprocating, turbine and rocket power plants using all types of heat and reaction sources. Environmental effects of energy conversion processes.

ENME 422. ENERGY CONVERSION II. (3)
Three lectures a week. Prerequisite: ENME 421. Advanced topics in energy conversion. Direct conversion processes of fuel cells, solar cells, thermionics, thermoelectrics and magnetohydrodynamics.

ENME 423. ENVIRONMENTAL ENGINEERING. (3)
Three lectures a week. Prerequisites: ENME 360, 321, senior standing in mechanical engineering. Heating and cooling load computations. Thermodynamics of refrigeration systems. Low temperature refrigeration. Problems involving extremes of temperature, pressure, acceleration and radiation.

ENME 424. THERMODYNAMICS II. (3)
Three lectures a week. Prerequisites: ENME 321, senior standing. Applications to special systems, change of phase, low temperature. Statistical concepts, equilibrium, heterogenous systems.

ENME 442. FLUID MECHANICS II. (3)
Three lectures a week. Prerequisite: ENME 342, senior standing Hydrodynamics with engineering applications. Stream function and velocity potential, conformal transformations, pressure distributions, circulation, numerical methods and analogies.

ENME 450. MECHANICAL ENGINEERING ANALYSIS FOR THE OCEANIC ENVIRONMENT. (3)
Prerequisite: Junior standing. Study of the characteristics of the marine environment which affect the design, operation and maintenance of mechanical equipment, effects of waves, currents, pressure, temperature, corrosion, and fouling. Study of design parameters for existing and proposed mechanical systems used in marine construction, on shipboard, in search and salvage operations.

ENME 451. MECHANICAL ENGINEERING SYSTEMS FOR UNDERWATER OPERATIONS. (3)
Prerequisite: ENME 450 or consent of instructor. Study of propulsion, control and environmental systems for submerged vehicles. Design of mechanical systems in support of diving and saturated living operations.

ENME 452. PHYSICAL AND DYNAMICAL OCEANOGRAPHY. (3)
Crosslisted as METO 420. Prerequisite: Consent of the instructor. Historical review of oceanography, physical, chemical; stratification and circulation properties of the ocean; dynamics of frictionless, frictional, wind driven and thermohaline circulations; air-sea interactions.

ENME 453. OCEAN WAVES, TIDES AND TURBULENCES. (3)
Crosslisted as METO 422. Prerequisites: METO 420 or consent of instructor. Introduction to the theory of oceanic wave motions, tides, wind waves, swells, storm surges, seiches, tsunamies, internal waves, turbulence, stirring, mixing and diffusion.

ENME 460. ELASTICITY AND PLASTICITY I. (3)
Three lectures a week. Prerequisite: ENME 400. Analysis of plates and shells, thick walled cylinders, columns, torsion of non-circular sections, and rotating disks.

ENME 461. DYNAMICS II. (3)
Three lectures a week. Prerequisites: ENME 360, differential equations, senior standing in mechanical engineering. Linear and non-linear plane and three-dimensional motion, moving axes, LaGrange's equation, Hamilton's principle, non-linear vibration, gyroscope, celestial mechanics.

ENME 462. INTRODUCTION TO ENGINEERING ACOUSTICS. (3)
Three lectures per week. Prerequisite: ENME 380 or equivalent. Study of the physical behavior of sound waves. Introduction to terminology and instrumentation used in acoustics. Criteria for noise and vibration control. Some fundamentals underlying noise control and applications to ventilation systems, machine and shop quieting, office buildings, jet noise, transportation systems and underwater sound.

ENME 463. MECHANICAL ENGINEERING ANALYSIS. (3)
Three lectures a week. Prerequisite: MATH 246 or ENME 380. Mathematical modeling of physical situations. Solution of problems expressed by partial differential equations. Application of Fourier series and integrals, Laplace transformation, Bessel functions, Legendre polynomials and complex variables to the solution of engineering problems in mechanical vibrations, heat transfer, fluid mechanics and automatic control theory.

ENME 465. INTRODUCTORY FRACTURE MECHANICS. (3)
Three lectures per week. Prerequisite: Senior standing in engineering. An examination of the concepts of fracture in members with pre-existing flaws. Emphasis is primarily on the mechanics aspects with the development of the Griffith theory and the introduction of the stress intensity factor, K, associated with different types of cracks. Fracture phenomena are introduced together with critical values of the fracture toughness of materials. Testing procedures for characterizing materials to-

gether with applications of fracture mechanics to design are treated.

ENME 480. ENGINEERING EXPERIMENTATION. (3)
One lecture and two laboratory periods a week. Prerequisite: Senior standing in mechanical engineering. Theory of experimentation. Applications of the principles of measurement and instrumentation systems to laboratory experimentation. Experiments in fluid mechanics, solid mechanics and energy conversion. Selected experiments or assigned projects to emphasize planned procedure, analysis and communication of results, analogous systems and leadership.

ENME 481. ENGINEERING EXPERIMENTATION. (3)
One lecture and two laboratory periods a week. Prerequisite: Senior standing in mechanical engineering. Theory of experimentation. Applications of the principles of measurement and instrumentation systems to laboratory experimentation. Experiments in fluid mechanics, solid mechanics and energy conversion. Selected experiments or assigned projects to emphasize planned procedure, analysis and communication of results, analogous systems and leadership.

ENME 488. SPECIAL PROBLEMS. (3)
Three lectures a week. Prerequisite: Senior standing in mechanical engineering. Advanced problems in mechanical engineering with special emphasis on mathematical and experimental methods.

ENME 489. SPECIAL TOPICS IN MECHANICAL ENGINEERING. (3)
Prerequisite: Permission of instructor. May be taken for repeated credit up to a total of six credits, with the permission of the student's advisor. Selected topics of current importance in mechanical engineering.

ENGINEERING, NUCLEAR

ENNU 215. INTRODUCTION TO NUCLEAR TECHNOLOGY. (3)
Prerequisites: MATH 141 and PHYS 161. Engineering problems of the nuclear energy complex, including basic theory, use of computers, nuclear reactor design and isotopic and chemical separations.

ENNU 310. ENVIRONMENTAL ASPECTS OF NUCLEAR ENERGY. (3)
Protection of the public and the environment from the hazards of nuclear operations. Radiation monitoring, handling and disposal of radioactive wastes. Site selection, plant design and operation as related to the environment.

ENNU 320. NUCLEAR REACTOR OPERATION. (3)
Introduction to nuclear reactor operations. Outline of reactor theory. Nature and monitoring techniques of ionizing radiation, radiation safety. Reactor instrument response. Operation of the University of Maryland nuclear reactor.

ENNU 430. RADIOISOTOPE POWER SOURCES. (3)
Prerequisite: ENNU 215 or permission of instructor. Principles and theory of radioisotope power sources. Design and use of nuclear batteries and small energy conversion devices.

ENNU 435. ACTIVATION ANALYSIS. (3)
Prerequisite: ENNU 215 or permission of instructor. Principles and techniques of activation analysis involving neutrons, photons and charged particles. Emphasis placed upon application of this analytical technique to solving environmental and engineering problems.

ENNU 440. NUCLEAR TECHNOLOGY LABORATORY. (3)
One lecture and two laboratory periods a week. Prerequisites: PHYS 263, MATH 240. Techniques of detecting and making measurements of nuclear or high energy radiation. Radiation safety experiments. Both a sub-critical reactor and the swimming pool critical reactor are sources of radiation.

ENNU 450. NUCLEAR REACTOR ENGINEERING I. (3)
Prerequisites: MATH 246 and PHYSICS 263 or consent of instructor. Elementary nuclear physics, reactor theory, and reactor energy transfer. Steady-state and time-dependent neutron distributions in space and energy. Conduction and convective heat transfer in nuclear reactor systems.

ENNU 455. NUCLEAR REACTOR ENGINEERING II. (3)
Prerequisite: ENNU 450. General plant design considerations including radiation hazards and health physics, shielding design, nuclear power economics, radiation effects on reactor materials, and various types of nuclear reactor systems.

ENNU 468. RESEARCH. (2-3)
Prerequisite: Permission of the staff. Investigation of a research project under the direction of one of the staff members. Comprehensive reports are required. Repeatable to a maximum of six semester hours.

ENNU 470. INTRODUCTION TO CONTROLLED FUSION. (3)
Prerequisite: Senior standing in engineering or consent of instructor. The principles and the current status of research to achieve controlled thermonuclear power production. Properties of ionized gases relating to confinement and heating. Concepts of practical fusion devices.

ENNU 480. REACTOR CORE DESIGN. (3)
Prerequisite: ENNU 450 or consent of instructor. Design of nuclear reactor cores based on a sequence of standard computer codes. Thermal and epithermal cross sections, multigroup diffusion theory in one and two dimensions and fine structure flux calculations using transport theory.

ENTOMOLOGY

ENTM 100. INSECTS. (3)
A survey of the major groups of insects, their natural history, and their relationships with man and his environment.

ENTM 111. BEEKEEPING. (2)
A study of the life history, behavior and seasonal activities of the honeybee, its place in pollination of flowers with emphasis on plants of economic importance and bee lore in literature.

ENTM 200. INTRODUCTORY ENTOMOLOGY. (3)
Two lectures and one two-hour laboratory period a week. Prerequisite: One semester of college zoology. The position of insects in the animal kingdom, their gross structure, classification into orders and principal families and the general economic status of insects. A collection of common insects is required.

ENTM 252. AGRICULTURAL INSECT PESTS. (3)
Two lectures and one two-hour laboratory period a week. Prerequisite: BOTN 100 or ZOOL 101. An introduction to the principal insect pests of fruit, vegetable, forage, and ornamental crops, with special reference to Maryland agriculture. Not open to entomology majors.

ENTM 351. INTRODUCTION TO INSECT POPULATION MANAGEMENT. (3)
Three lecture periods a week. An introduction to the theory and practice of management of insect populations. The course explores the development of all insect pest population, suppression methods, as well as the management of insect populations beneficial to man. The main theme of the course is how man can manipulate environmental components for the purpose of population regulation of insects and the beneficial and harmful effects of these manipuplations.

ENTM 399. SPECIAL PROBLEMS. (1-3)
Credit and prerequisites to be determined by the department. Investigations of assigned entomological problems.

ENTM 407. ENTOMOLOGY FOR SCIENCE TEACHERS. (4)
Summer. Four lectures and four three-hour laboratory

periods a week. This course will include the elements of morphology, taxonomy and biology of insects using examples commonly available to high school teachers. It will include practice in collecting, preserving, rearing and experimenting with insects insofar as time will permit.

ENTM 412. ADVANCED APICULTURE. (3)
One lecture and two three-hour laboratory periods a week. Prerequisite: ENTM 111. The theory and practice of apiary management. Designed for the student who wishes to keep bees or requires a practical knowledge of bee management.

ENTM 421. INSECT TAXONOMY AND BIOLOGY. (4)
Two lectures and two three-hour laboratory periods a week. Prerequisite: ENTM 200. Introduction to the principles of systematic entomology and the study of all orders and the important families of insects; immature forms considered.

ENTM 432. INSECT MORPHOLOGY. (4)
Two lectures and two three-hour laboratory periods a week. Prerequisite: ENTM 200. A basic study of insect form, structure and organization in relation to function.

ENTM 442. INSECT PHYSIOLOGY. (4)
Two lectures and two three-hour laboratory periods a week. Prerequisites: ENTM 200, CHEM 104 or equivalent. Lectures and laboratory exercises on the cuticle, growth, endocrines, muscles, circulation, nerves, digestion, excretion and reproduction in insects.

ENTM 451. ECONOMIC ENTOMOLOGY. (4)
Two lectures and two two-hour laboratory periods a week. Prerequisite: ENTM 200. The recognition, biology and control of insects injurious to fruit and vegetable crops, field corps and stored products.

ENTM 452. INSECTICIDES. (2)
Prerequisite: Consent of the department. The development and use of contact and stomach poisons, fumigants and other important chemicals, with reference to their chemistry, toxic action, compatability, and host injury. Recent research emphasized.

ENTM 462. INSECT PATHOLOGY. (3)
Two lectures and one three-hour laboratory period per week. Prerequisite: MICB 200. Prerequisite or corequisite: ENTM 442, or consent of the instructor. An introduction to the principal insect pathogens with special refence to symptomology, epizootiology, and microbial control of insect pests.

ENTM 472. MEDICAL AND VETERINARY ENTOMOLOGY. (4)
Three lectures and one two-hour laboratory period a week. Prerequisite: ENTM 200 or consent of the department. A study of the morphology, taxonomy, biology and control of the arthropod parasites and disease vectors of man and animals. The ecology and behavior of vectors in relation to disease transmission will be emphasized.

ENTM 498. SEMINAR. (1)
Prerequisite: Senior standing. Presentation of original work, reviews and abstracts of literature.

FOOD SCIENCE

FDSC 111. INTRODUCTION TO FOOD SCIENCE. (3)
Two lectures and one laboratory per week. An introductory course to orient the student in the broad field of food science. Includes a historical and economic survey of the major food industries, composition and nutritive value, quality aspects, spoilage, preservation, sanitation, standards and regulation of foods.

FDSC 398. SEMINAR. (1)
Presentation and discussion of current literature and research in food science.

FDSC 399. SPECIAL PROBLEMS IN FOOD SCIENCE. (1-3)
Prerequisite: Approval of staff. Designed for advanced undergraduates in which specific problems in food science will be assigned. Four credit maximum per student.

FDSC 412. PRINCIPLES OF FOOD PROCESSING I. (3)
Two lectures and one laboratory per week. A study of the basic methods by which foods are preserved (unit operations). Effect of raw product quality and the various types of processes on yield and quality of the preserved products.

FDSC 413. PRINCIPLES OF FOOD PROCESSING II. (3)
Three lectures per week. A detailed study of food processing with emphasis on line and staff operations, including physical facilities, utilities, pre- and post-processing operations, processing line development and sanitation.

FDSC 421. FOOD CHEMISTRY. (3)
Two lectures and one laboratory per week. Prerequisite: CHEM 201, 202. The application of basic chemical and physical concepts to the composition and properties of foods. Emphasis will be on the relationship of processing technology to the keeping quality, nutritional value and acceptability fo foods.

FDSC 422. FOOD PRODUCT RESEARCH AND DEVELOPMENT. (3)
Two lectures and one laboratory per week. Prerequisite: FDSC 413, CHEM 461, or permission of instructor. A study of the research and development function for improvement of existing products and development of new, economically feasible and marketable food products. Application of chemical-physical characteristics of ingredients to produce optimum quality products, cost reduction, consumer evaluation, equipment and package development.

FDSC 430. FOOD MICROBIOLOGY. (4)
Two lectures and one formal laboratory per week. Prerequisite: MICB 200. Additional independent laboratory work required, time would be euivalent to a second laboratory period per week. Microorganisms of major importance to the food industry are studied with emphasis on their isolation, identification, bio-processing of foods, and public health significance.

FDSC 431. FOOD QUALITY CONTROL. (2)
Two lectures per week. Definition and organization of the quality control function in the food industry; preparation of specifications; statistical methods for acceptance sampling, in-plant and processed product inspection. Instrumental and sensory methods for evaluating sensory quality, identity and wholesomeness and their integration into grades and standards of quality.

FDSC 432. FOOD QUALITY CONTROL LABORATORY. (2)
Two laboratories per week. Prerequisite or concurrent registration in FDSC 431. Chemical-physical, instrumental, microanalytical, sensory analysis of food quality attributes. Using data obtained, calculate sampling plans, control charts, process capabilities, grades and standards.

FDSC 442. HORTICULTURAL PRODUCTS PROCESSING. (3)
Two lectures and one laboratory per week. Commercial methods of canning, freezing, dehydrating, fermenting, and chemical preservation of fruit and vegetable crops.

FDSC 451. DAIRY PRODUCTS PROCESSING. (3)
Two lectures and one laboratory per week. Method of production of fluid milk, butter, cheese, condensed and evaporated milk and milk products and ice cream.

FDSC 461. TECHNOLOGY OF MARKET EGGS AND POULTRY. (3)
Two lectures and one laboratory per week. A study of the technological factors concerned with the processing, storage, and marketing of eggs and poultry and the factors affecting their quality.

FDSC 471. MEAT AND MEAT PROCESSING. (3)
Two lectures and one laboratory per week. Prerequisite:

CHEM 461 or permission of instructor. Physical and chemical characteristics of meat and meat products, meat processing, methods of testing and product development.

FDSC 482. SEAFOOD PRODUCTS PROCESSING. (3)
Two lectures and one laboratory a week. Prerequisite: CHEM 461 or permission of instructor. The principal preservation methods for commercial seafood products with particular reference to the invertebrates. Chemical and microbiological aspects of processing are emphasized.

FAMILY AND COMMUNITY DEVELOPMENT

FMCD 105. INTRODUCTION TO FAMILY LIVING. (3)
Interrelations of the individual and his family through the various stages of the family life cycle; underlying principles of guidance of children as applied to home situations.

FMCD 250. DECISION MAKING IN FAMILY LIVING. (3)
Decision making in relation to family values, philosophies, goals, and resources, and general socio-economic conditions.

FMCD 260. FAMILY RELATIONS. (3)
Socialization toward marriage and contemporary lifestyle patterns in interpersonal relations and marriage.

FMCD 270. PROFESSIONAL SEMINAR. (2)
Survey of professional opportunities, responsibilities and trends in each departmental area of emphasis. Concentration will be on the development of personal qualities and professional ethics essential for effective occupational performance.

FMCD 280. HOUSEHOLD EQUIPMENT AND SPACE UTILIZATION. (4)
Two lectures, two laboratory sessions. Study of household equipment and space utilization as they affect family members in task performance. Emphasis is on the consumer's viewpoint, supported by laws of the physical sciences.

FMCD 330. FAMILY PATTERNS. (3)
Prerequisites: FMCD 260 and PSYC 100. A study of family patterns within the sub-cultures of America and various other cultures. Emphasis will be given to those patterns and life styles which evolve as adaptations to cultural demands.

FMCD 332. THE CHILD IN THE FAMILY. (3)
Prerequisite: PSYC 100 or SOCY 100. Study of the child from prenatal stage through adolescence, with emphasis on responsibility for guidance in the home. Biological and psychosocial needs as they affect the child's relationship with his family, peers and society.

FMCD 341. PERSONAL AND FAMILY FINANCE. (3)
Study of individual and family finances with particular emphasis upon financial planning, savings, insurance, investments, income taxes, housing, and use of credit.

FMCD 344. RESIDENT EXPERIENCE IN HOME MANAGEMENT. (3)
Four to nine weeks. Prerequisite: FMCD 250. Group living and management experience providing opportunity to examine decision patterns, participate in group decision making and analyze value systems and resource utilization which differ from the student's own. (Each student pays $60 which is used for food and supplies. The University Housing Office bills non-dormitory students for room rent at the rate of $5 per week).

FMCD 345. PRACTICUM WITH FAMILIES, CHILDREN, HOME MANAGEMENT. (3)
A. Families
B. Children and Youth
C. Management and Consumer Studies
Planned, supervised experience in which the student is a participant/observer in a community program serving families. Monthly seminars are held.
D. Applied Home Management
An alternate for FMCD 344, it provides an opportunity for the student who is currently managing her own home to meet objectives similar to those stated for FMCD 344.

FMCD 370. COMMUNICATION SKILLS AND TECHNIQUES. (3)
The objective of this course is to provide training in communication skills relevant to interpersonal situations, i.e., dating, marriage and family life. Relevant communication concepts, principles and models are discussed and demonstrated.

FMCD 431. FAMILY CRISES AND REHABILITATION. (3)
This course deals with various types of family crises situations and how families cope with the rehabilitation process. It covers issues at various stages of the family cycle ranging from divorce, teenage runaways, abortion, to the effect of death on a family. Role playing and interviewing techniques are demonstrated and ways of helping the family through the crises are emphasized.

FMCD 443. CONSUMER PROBLEMS. (3)
Consumer practices of American families. Merchandising practices as they affect the consumer. Organizations and laws in the interest of the consumer.

FMCD 446. LIVING EXPERIENCES WITH FAMILIES. (3-6)
A. Domestic Intercultural
B. International Intercultural
Prerequisites: FMCD 330, ANTH 101; FMCD 250; optional, language compelence. An individual experience in living with families of a sub-culture within the U.S. or with families of another country, participating in family and community activities. A foreign student may participate and live with an American family.

FMCD 485. INTRODUCTION TO FAMILY COUNSELING. (3)
This course provides the fundamental theoretical concepts and clinical procedures that are unique to marital and family therapy. These techniques are contrasted with individually-orientated psychotherapy. Pre-marital, marital and family, and divorce counseling techniques are demonstrated and evaluated.

FMCD 487. LEGAL ASPECTS OF FAMILY PROBLEMS. (3)
Laws and legal involvement that directly affect specific aspects of the family: adoption, marriage, estate planning, property rights, wills, etc. Emphasis will be given to the involvement of a professional lawyer; principles and interpretation of the law.

FMCD 499. SPECIAL TOPICS. (1-3)
A. Family Studies
B. Community Studies
C. Management and Consumer Studies

FOREIGN LANGUAGE

FOLA 001. ENGLISH FOR FOREIGN STUDENTS. (3)
An introduction to English usage, adapted to the needs of the non-English-speaking student. Pronunciation, spelling, syntax, vocabulary. The difference between English and various other languages are stressed. Reading of modern American short stories.

FOLA 002. ENGLISH FOR FOREIGN STUDENTS. (3)
An introduction to English usage, adapted to the needs of the non-English-speaking student. Pronunciation, spelling, syntax, vocabulary. The difference between English and various other languages are stressed. Reading of modern American short stories.

FOOD

FOOD 105. PROFESSIONAL ORIENTATION. (1)
A series of lectures introducing the student to the broad field of careers in food, nutrition, dietetics, and institution administration. Includes trends, role of related sciences, educational and personal requirements, ethics, and opportunities in each professsional area.

FOOD 110. FOOD AND NUTRITION OF INDIVIDUALS AND FAMILIES. (3)
Two lectures and one two-hour laboratory period a week. A study of food in contemporary living. The economic, social and esthetic implications of food as well as its nutritive value. Selection and use of food in relation to eating habits, health and well-being of the individual. Survey of meal preparation and service applied to family situations.

FOOD 200. SCIENTIFIC PRINCIPLES OF FOOD. (3)
Two lectures and one two-hour laboratory period a week. Prerequisites: FOOD 110 or NUTR 100, and CHEM 103 or concurrent registration. Study of basic scientific principles as applied to food preparation processes. For nondepartmental majors.

FOOD 240. SCIENCE OF FOOD PREPARATION. (3)
One lecture and two two-hour laboratory periods a week. Prerequisites: FOOD 110, CHEM 104 or concurrent registration. Composition and structure of food with study of the fundamental principles involved in food preparation. Especially designed for departmental majors.

FOOD 250. SCIENCE OF FOOD PREPARATION. (3)
One lecture and two two-hour laboratory periods a week. Prerequisites: FOOD 110, CHEM 104 or concurrent registration. Composition and structure of food with study of the fundamental principles involved in food preparation. Especially designed for departmental majors.

FOOD 260. MEAL MANAGEMENT. (3)
Two lectures and one three-hour laboratory a week. Prerequisites: FOOD 200 or 240. Retail selection of food commodities in relation to levels of spending; management of family meals through organization of available resources.

FOOD 300. ECONOMICS OF FOOD CONSUMPTION. (3)
Prerequisites: Economics and consent of the instructor: Interrelations of food, population and economic progress; trends in food-consumption patterns; world and local food problems.

FOOD 440. ADVANCED FOD SCIENCE. (3)
Three lectures per week. Prerequisites: FOOD 240, 250, CHEM 461 or concurrent registration. Chemical and physical properties of food as related to consumer use in the home and institutions.

FOOD 445. ADVANCED FOOD SCIENCE LABORATORY. (1)
One three-hour laboratory per week. Prerequisite: CHEM 201 and consent of instructor. Chemical determination of selected components in animal and plant foods.

FOOD 450. EXPERIMENTAL FOOD SCIENCE. (3)
One lecture, two laboratories per week. Prerequisite: FOOD 440 or euivalent. Individual and group laboratory experimentation as an introduction to methods of food research.

FOOD 480. FOOD ADDITIVES. (3)
Prerequisite: FOOD 440 or equivalent. Effects of intentional and incidental additives on food quality, nutritive value and safety. FDA approved additives, GRAS substances, pesticide residues, mycotoxins, antibiotics, and hormones will be reviewed.

FOOD 490. SPECIAL PROBLEMS IN FOODS. (2-3)
Prerequisite: FOOD 440 and consent of instructor. Individual selected problems in the area of food science.

FRENCH

FREN 001. ELEMENTARY FRENCH FOR GRADUATE STUDENTS. (3)
Intensive elementary course in the French language designed particularly for graduate students who wish to acquire a reading knowledge.

FREN 101. ELEMENTARY FRENCH. (4)
Introduction to basic structures and pronunciation. Four recitations per week plus one voluntary, recommended laboratory hour.

FREN 102. ELEMENTARY FRENCH. (4)
Completion of basic structures with emphasis on reading and speaking skills. Four recitations per week plus one voluntary, recommended laboratory hour.

H—HONORS
Limited to students recommended by their 101 instructor. An accelerated course of study with completion of basic structures. Emphasis on reading as well as oral and written expression. Five recitations per week plus one voluntary, recommended hour of live drill. Fulfills the language requirement.

FREN 103. REVIEW OF ELEMENTARY FRENCH. (4)
Limited to students who have had at least two years of high school French (or equivalent) or who do not qualify for FREN 104. Four recitations per week plus one hour of voluntary, recommended laboratory.

FREN 104. INTERMEDIATE FRENCH. (4)
Grammar review with extended reading, discussion, and composition. Four recitations per week plus one voluntary hour. Fulfills the language requirement.

H—HONORS
Limited to students recommended by their instructor of FREN 102, 102H, or 103. Grammar review with extensive reading, discussion, and composition. Five recitations per week plus one voluntary, recommended live drill.

FREN 111. ELEMENTARY FRENCH. (3)
Given as intensive course in summer session. Three recitations and one drill per week. Study of spoken and written language and development of the four language skills.

FREN 112. ELEMENTARY FRENCH. (3)
Given as intensive course in summer session. Three recitations and one drill per week. Study of spoken and written language and development of the four language skills.

FREN 113. REVIEW OF ELEMENTARY FRENCH. (3)
Two recitations and two audio-lingual drills per week, or three recitations and one audio-lingual drill, depending on circumstances. Enrollment limited to students who, having taken placement examination, have failed to qualify for FREN 114.

FREN 114. INTERMEDIATE FRENCH. (3)
Three recitations per week. Given as intensive course in summer session. Prerequisite: FREN 112 or equivalent or FREN 113. Study of linguistic structure, further development of audio-lingual and writing ability, and reading of literary texts with discussion in French.

FREN 115. INTERMEDIATE FRENCH. (3)
Three recitations per week. Given as intensive course in summer session. Prerequisite: FREN 112 or equivalent or FREN 113. Study of linguistic structures, further development of audio-lingual and writing ability, and reading of literary texts with discussion in French.

FREN 201. REVIEW GRAMMAR AND COMPOSITION. (3)
Prerequisite: FREN 104 or 115, or course chairman's consent. An intensive review of major aspects of contemporary grammatical usage; training in comprehension; an introduction to guided composition.

FREN 211. PHONETICS AND SPOKEN FRENCH. (3)
Prerequisite: FREN 104 or 115, or course chairman's consent. Not open to native speakers of French. Introduction of the French phonetic system, with practice in the spoken language; international phonetic alphabet; intonation.

FREN 221. READINGS IN MODERN LITERATURE. (3)
Prerequisite: FREN 104 or 115, or course chairman's consent. An introduction to French literature from mid-nineteenth century to the present day, through the critical analysis of complete texts representative of their genre. Discussion and examinations in English.

H—HONORS
See description above for FREN 221. Discussion and examinations in French.

FREN 301. COMPOSITION AND STYLE. (3)
Prerequisite: FREN 201, or course chairman's consent. An introduction to the techniques of the *dissertation générale;* grammatical analysis; free composition.

FREN 302. ADVANCED COMPOSITION AND STYLE. (3)
Prerequisite: FREN 301, or course chairman's consent. Training in the art of translation; *dissertation générale;* analysis of the role of language in literature.

FREN 311. INTERMEDIATE SPOKEN FRENCH. (3)
Prerequisite: FREN 211, or course chairman's consent. Not open to native speakers of French. Vocabulary development to the level of the contemporary French press; practical phonetics and intonation practice.

FREN 312. ADVANCED SPOKEN FRENCH. (3)
Prerequisite: FREN 311, or course chairman's consent. Not open to native speakers of French. Advanced conversation on multiple aspects of contemporary French culture; further practical phonetics and intonation practice.

FREN 321. READINGS IN ENLIGHTENMENT AND ROMANTIC LITERATURE. (3)
Prerequisite: FREN 221, or course chairman's consent. An introduction to French literature from the early eighteenth to the mid-nineteenth centuries, through the critical analysis of complete texts representative of their genre. Discussion and examinations in English.

FREN 322. READINGS IN RENAISSANCE AND CLASSICAL LITERATURE. (3)
Prerequisite: FREN 221, or course chairman's consent. Prerequisite: FREN 321, or course chairman's consent. An introduction to French literature from the mid-sixteenth to the seventeenth centuries, through the critical analysis of complete texts representative of their genre. Discussion and examinations in English.
H—HONORS
See description above for FREN 322. Discussion and examinations in French.

FREN 331. FRENCH CIVILIZATION. (3)
French life, customs, culture, traditions. The historical development; present-day France.

FREN 332. FRENCH CIVILIZATION. (3)
French life. Customs, culture, traditions. The historical development; present-day France.

FREN 400. APPLIED LINGUISTICS. (3)
The nature of applied linguistics and its contribution to the effective teaching of foreign languages. Comparative study of English and French, with emphasis upon points of divergence. Analysis, evaluation and construction of related drills.

FREN 401. INTRODUCTION TO STYLISTICS. (3)
Prerequisite: FREN 302, or course chairman's consent. Comparative stylistic analysis; detailed grammatical analysis; translation.

FREN 405. EXPLICATION DE TEXTES. (3)
Oral and written analysis of short literary works, or of excerpts from longer works chosen for their historical, structural, or stylistic interest, with the purpose of training the major to understand literature in depth and to make mature esthetic evaluations of it.

FREN 411. INTRODUCTION TO MEDIEVAL LITERATURE. (3)
French literature from the ninth through the fifteenth century. La Chanson Epique, Le Roman Courtois, Le Lai; La Literature Bourgeoise, Le Theatre, La Poesie Lyrique.

FREN 412. INTRODUCTION TO MEDIEVAL LITERATURE. (3)
French literature from the ninth through the fifteenth century. La Chanson Epique, Le Roman Courtois, Le Lai; La Literature Bourgeoise, Le Theatre, La Poesie Lyrique.

FREN 421. FRENCH LITERATURE OF THE SIXTEENTH CENTURY. (3)
The Renaissance in France: Humanism, Rabelais, Calvin, the Pleiade, Montaigne, Baroque poetry.

FREN 422. FRENCH LITERATURE OF THE SIXTEENTH CENTURY. (3)
The Renaissance in France: Humanism, Rabelais, Calvin, the Pleiade, Montaigne, Baroque poetry.

FREN 431. FRENCH LITERATURE OF THE SEVENTEENTH CENTURY. (3)
Descartes, Pascal, Corneille, Racine; the remaining great classical writers, with special attention to Moliere.

FREN 432. FRENCH LITERATURE OF THE SEVENTEENTH CENTURY. (3)
Descartes, Pascal, Corneille, Racine; the remaining great classical writers, with special attention to Moliere.

FREN 441. FRENCH LITERATURE OF THE EIGHTEENTH CENTURY. (3)
Development of philosophical and scientific movement; Montesquieu, Voltaire, Diderot, Rousseau.

FREN 442. FRENCH LITERATURE OF THE EIGHTEENTH CENTURY. (3)
Development of philosophical and scientific movement; Montesquieu, Voltaire, Diderot, Rousseau.

FREN 451. FRENCH LITERATURE OF THE NINETEENTH CENTURY. (3)
Drama and poetry from romanticism to symbolism; the major prose writers of the same period.

FREN 452. FRENCH LITERATURE OF THE NINETEENTH CENTURY. (3)
Drama and poetry from romanticism to symbolism; the major prose writers of the same period.

FREN 461. STUDIES IN TWENTIETH CENTURY LITERATURE—THE EARLY YEARS. (3)
French poetry, theater and the novel during the age of Proust and Gide.

FREN 462. STUDIES IN TWENTIETH CENTURY LITERATURE—MID-CENTURY WRITERS. (3)
Modern French poetry, theater and the novel, with special emphasis on the literature of anxiety and Existentialism.

FREN 463. STUDIES IN TWENTIETH CENTURY LITERATURE—THE CONTEMPORARY SCENE. (3)
French writers and literary movements since about 1950, with special emphasis on new forms of the novel and theater.

FREN 478. THEMES AND MOVEMENTS OF FRENCH LITERATURE IN TRANSLATION. (3)
Studies treatments of thematic problems or of literary or historical movements in French literature. Topic to be determined each semester. Given in English.

FREN 479. MASTERWORKS OF FRENCH LITERATURE IN TRANSLATION. (3)
Treats the works of one or more major French writers. Topic to be determined each semester. Given in English.

FREN 488. PRO-SEMINAR IN A GREAT LITERARY FIGURE. (3)
Each semester a specialized study will be made of one great French writer chosen from some representative literary period or movement since the middle ages. Repeatable for a maximum of six credits.

FREN 489. PRO-SEMINAR IN THEMES OR MOVEMENTS OF FRENCH LITERATURE. (3)
Repeatable for a maximum of six credits.

FREN 491. HONORS READING COURSE. POETRY. (3)
H—HONORS, POETRY
Supervised readings to be taken normally only by students admitted to the honors program.

FREN 492. HONORS READING COURSE. NOVEL. (3)
H—HONORS, NOVEL
Supervised readings to be taken normally only by students admitted to the honors program.

FREN 493. HONORS READING COURSE, DRAMA. (3)
H—HONORS, DRAMA
Supervised readings to be taken normally only by students admitted to the honors program.

FREN 494. HONORS INDEPENDENT STUDY. (3)
H—HONORS
Honors Independent Study involves guided readings based on an Honors reading list and tested by a 6 hour written examination. Honors 494 and 495 are required to fulfill the departmental Honors requirement in addition to two out of the following: 491H, 492H, 493H. Open only to students admitted to the departmental Honors Program.

FREN 495. HONORS THESIS RESEARCH. (3)
H—HONORS
Honors Thesis Research involves the writing of a paper under the direction of a professor in this department and an oral examination. Honors 494 and 495 are required to fulfill the departmental Honors requirement in addition to two out of the following: 491H, 492H, 493H. Open only to students admitted to the departmental Honors Program.

FREN 498. SPECIAL TOPICS IN FRENCH LITERATURE. (3)
Repeatable for a maximum of six credits.

FREN 499. SPECIAL TOPICS IN FRENCH STUDIES. (3)
An aspect of French studies, the specific topic to be announced each time the course is offered. Repeatable for a maximum of six credits.

GEOGRAPHY

GEOG 100. INTRODUCTION TO GEOGRAPHY. (3)
An introduction to the broad field of geography as it is applicable to the general education student. The course presents the basic rationale of variations in human occupancy of the earth and stresses geographic concepts relevant to understanding world, regional and local issues.

GEOG 201. INTRODUCTORY PHYSICAL GEOGRAPHY. (3)
Examination of the basic concepts of physical geography including those involving landforms, climate, vegetation, soils, and mineral resources, and the interrelations between them.

GEOG 202. INTRODUCTORY CULTURAL GEOGRAPHY. (3)
Examination of the basic concepts of human geography such as those relating to geography of political, population, settlement, and cultural phenomena.

GEOG 203. INTRODUCTORY ECONOMIC GEOGRAPHY. (3)
A study of physical and economic factors that underlie production. The roles of climate, soils, and landforms; and geographic distribution of agricultural, power and mineral resources, and the nature and uses of cartographic materials.

GEOG 300. INTRODUCTION TO GEOGRAPHIC RESEARCH AND WRITING. (3)
Development of research methods in geography including the formulation of problem, the establishment of hypotheses, development of structures for testing hypotheses, and practice with forms of geographic presentation. Maps, quantitative and field methods will be used as appropriate.

GEOG 370. CARTOGRAPHY AND GRAPHICS PRACTICUM. (3)
One hour lecture and two two-hour laboratory periods a week. Techniques and problems of compilation, design and construction of various types of maps and graphics. Relationships between map making and modern methods of production and reproduction. Trips to representative plants. Laboratory work directed toward cartographic problems encountered in the making of non-topographic maps.

GEOG 372. INTERPRETATION OF TOPOGRAPHIC MAPS AND AERIAL PHOTOGRAPHS. (3)
Two hours of lecture and two hours of laboratory per week. Interpretation of aerial photographs with emphasis on the recognition of landforms of different types and man-made features. Study of vegetation, soil and other data that may be derived from aerial photographs. Types of aerial photographs and limitations of photo interpretation.

GEOG 376. INTRODUCTORY QUANTITATIVE METHODS IN GEOGRAPHY. (3)
Basic principles of quantitative analysis in the context of geographic methodology. The focus is on standard statistical procedures used in spatial analysis rather than on the mathematical basis of the tools. The nature of quantitative data and a range of both descriptive and analytical quantitative methods will be examined.

GEOG 380. LOCAL FIELD COURSE. (3)
Training in geographic field methods and techniques. Field observation of land use in selected rural and urban areas in eastern Maryland. One lecture per week with Saturday and occasional weekend field trips. Primarily for undergraduates.

GEOG 381. FIELD STUDY—PHYSICAL. (1)

GEOG 382. FIELD STUDY—RURAL. (1)

GEOG 383. FIELD STUDY—URBAN. (1)

GEOG 384. FIELD STUDY—FIELD METHODS. (1)

GEOG 385. SCIENTIFIC METHODOLOGY AND HISTORY OF GEOGRAPHY. (3)
For undergraduate and graduate majors in geography. May be taken also by students with a minimum of nine hours in systematic and six hours in regional geography. A comprehensive and systematic study of the history, nature and basic principles of geographic thought; a critical evaluation of some of the important geographical works and methods of geographic research.

GEOG 400. GEOGRAPHY OF NORTH AMERICA. (3)
An examination of the contemporary patterns of American and Canadian life from a regional viewpoint. Major topics include: the significance of the physical environment, resource use, the political framework, economic activities, demographic and socio-cultural characteristics, regional identification, and regional problems.

GEOG 402. GEOGRAPHY OF MARYLAND AND ADJACENT AREAS. (3)
An analysis of the physical environment, natural resources, and population in relation to agriculture, industry, transport, and trade in the state of Maryland and adjacent areas.

GEOG 406. HISTORICAL GEOGRAPHY OF NORTH AMERICA BEFORE 1800. (3)
An analysis of the changing geography of the U.S. and Canada from pre-Columbian times to the end of the 18th century. Emphasis on areal variations and changes in the settlements and economies of Indian and colonial populations. Areal specialization and the changing patterns of agriculture, industry, trade, and transportation. Population growth, composition and interior expansion. Regionalization.

GEOG 407. HISTORICAL GEOGRAPHY OF NORTH AMERICA AFTER 1800. (3)
An analysis of the changing geography of the U.S. and Canada from 1800 to the 1920's. Emphasis on the settlement expansion and socio-economic development of the U.S., and comparisons with the Canadian experience. Immigration, economic activities, industrialization, transportation and urbanization.

GEOG 410. GEOGRAPHY OF EUROPE. (3)
Agricultural and industrial development of Europe and present-day problems in relation to the physical and cultural setting of the continent and its natural resources.

GEOG 411. HISTORICAL GEOGRAPHY OF EUROPE. (3)
An analysis of the changing geography of Europe at selected periods from prehistoric times until the end of the 19th century, with particular emphasis on Western Europe. Changing patterns of population, agriculture, in-

dustry, trade and transportation. Development of the nation-state. Impact of overseas expansion. Agricultural and Industrial Revolutions.

GEOG 415. ECONOMIC RESOURCES AND DEVELOPMENT OF AFRICA. (3)
The natural resources of Africa in relation to agricultural and mineral production; the various stages of economic development and the potentialities of the future.

GEOG 420. GEOGRAPHY OF ASIA. (3)
Lands, climates, natural resources, and major economic activities in Asia (except Soviet Asia). Outstanding differences between major regions.

GEOG 421. ECONOMIC AND POLITICAL GEOGRAPHY OF EASTERN ASIA. (3)
Study of China, Korea, Japan, the Philippines; physical geographic setting, population, economic and political geography. Potentialities of major regions and recent developments.

GEOG 422. CULTURAL GEOGRAPHY OF CHINA AND JAPAN. (3)
Survey of geographical distribution and interpretation of cultural patterns of China and Japan. Emphasis on basic cultural institutions, outlook on life, unique characteristics of various groups. Trends of cultural change and contemporary problems.

GEOG 423. ECONOMIC AND POLITICAL GEOGRAPHY OF SOUTH AND SOUTHEAST ASIA. (3)
Study of the Indian subcontinent. Farther India, Indonesia; physical geographic setting, population, economic and political geography. Potentialities of various countries and regions and their role in present Asia.

GEOG 431. ECONOMIC AND CULTURAL GEOGRAPHY OF CARIBBEAN AMERICA. (3)
An analysis of the physical framework, broad economic and historical trends, cultural patterns, and regional diversification of Mexico, Central America, the West Indies.

GEOG 432. ECONOMIC AND CULTURAL GEOGRAPHY OF SOUTH AMERICA. (3)
A survey of natural environment and resources, economic development and cultural diversity of the South American republics, with emphasis upon problems and prospects of the countries.

GEOG 434. HISTORICAL GEOGRAPHY OF THE HISPANIC WORLD. (3)
An examination of the social, economic, political and cultural geography of the countries of the Iberian Peninsula and Latin America in the past with concentration on specific time periods of special significance in the development of these countries.

GEOG 435. GEOGRAPHY OF THE SOVIET UNION. (3)
The natural environment and its regional diversity. Geographical factors in the expansion of the Russian state. The geography of agricultural and industrial production in relation to available resources, transportation problems, and diversity of population.

GEOG 437. INTRODUCTION TO REGIONAL METHODS. (3)
Inquiry into the evolution of regional methodology with specific reference to geographic problems. Critical analysis and evaluation of past and contemporary theories and a thorough examination of alternate regional methodologies. Application of quantitative and qualitative techniques of regional analysis and synthesis to traditional and modern regional geography emphasizing principles of regionalization.

GEOG 440. GEOMORPHOLOGY. (3)
Study of major morphological processes, the development of land forms and the relationships between various types of land forms and land use problems. Examination of the physical features of the earth's surface and their geographic distributions.

GEOG 441. REGIONAL GEOMORPHOLOGY. (3)
Regional and comparative morphology, with special emphasis upon Anglo-America.

GEOG 445. CLIMATOLOGY. (3)
The geographic aspects of climate with emphasis on energy-moisture budgets, steady-state and non-steady state climatology, and climatic variations at both macro and micro-scales.

GEOG 446. SYSTEMATIC AND REGIONAL CLIMATOLOGY. (3)
Prerequisite: GEOG 445, or permission of instructor. Methodology and techniques of collecting and evaluating climatological information. A critical examination of climatic classifications. Distribution of world climates and their geographical implications.

GEOG 450. CULTURAL GEOGRAPHY. (3)
Prerequisite: GEOG 201, GEOG 202, or consent of instructor. An analysis of the impact of man through his ideas and technology on the evolution of geographic landscapes. Major themes in the relationships between cultures and environments.

GEOG 451. POLITICAL GEOGRAPHY. (3)
Geographical factors in national power and international relations; an analysis of the role of "geopolitics" and "geostrategy," with special reference to the current world scene.

GEOG 452. POPULATION GEOGRAPHY. (3)
Prerequisite: GEOG 201 or 203, or permission of the instructor. An analysis of world population distribution patterns as revealed by demographic data. Emphasis is placed upon a comparison of population density, growth, composition, and migration with natural resources and state of technological advancement. Case studies from the geographical literature will be used.

GEOG 455. URBAN GEOGRAPHY. (3)
Origins of cities, followed by a study of elements of site and location with reference to cities. The patterns and functions of some major world cities will be analyzed. Theories of land use differentiation within cities will be appraised.

GEOG 457. HISTORICAL GEOGRAPHY OF CITIES. (3)
The course is concerned with the urbanization of the United States and Canada prior to 1920. Both the evolution of the urban system across the countries and the spatial distribution of activities within cities will be considered. Specal attention is given to the process of industrialization and the concurrent structuring of residential patterns among ethnic groups.

GEOG 459. PRO-SEMINAR IN URBAN GEOGRAPHY. (3)
A problems-oriented course for students with a background in urban geography using a discussion/lecture format. It will focus on a particular sub-field within urban geography each time it is taught, taking advantage of the special interests of the instructor.

GEOG 460. ADVANCED ECONOMIC GEOGRAPHY I—AGRICULTURAL RESOURCES. (3)
Prerequisite: GEOG 201 or GEOG 203. The nature of agricultural resources, the major types of agricultural exploitation in the world and the geographic conditions. Main problems of conservation.

GEOG 461. ADVANCED ECONOMIC GEOGRAPHY II—MINERAL RESOURCES. (3)
Prerequisite: GEOG 201 or GEOG 203. The nature and geographic distribution of the principal power, metallic and other minerals. Economic geographic aspects of modes of exploitation. Consequences of geographic distribution and problems of conservation.

GEOG 462. WATER RESOURCES AND WATER RESOURCE PLANNING. (3)
Prerequisite: GEOG 201 or 203, or permission of instructor. Water as a component of the human environment. A systematic examination of various aspects of water, including problems of domestic and industrial water supply, irrigation, hydroelectric power, fisheries, navigation, flood damage reduction and recreation.

GEOG 463. GEOGRAPHIC ASPECTS OF POLLUTION (3)
The impact of man on his environment and resultant problems. Examination of the spatial aspects of physical and socio-economic factors in air, water, and land pollution.

GEOG 465. GEOGRAPHY OF TRANSPORTATION. (3)
The distribution of transport routes on the earth's surface, patterns of transport routes and media to conditions of the natural environment, population centers and their distribution.

GEOG 466. INDUSTRIAL LOCALIZATION. (3)
Factors and trends in the geographic distribution of the manufacturing industries of the world, analyzed with reference to theories of industrial location.

GEOG 470. HISTORY AND THEORY OF CARTOGRAPHY. (3)
The development of maps throughout history. Geographical orientation, coordinates and map scales. Map projections, their nature, use and limitations. Principles of representation of features on physical and cultural maps. Modern uses of maps and relationships between characteristics of maps and use types.

GEOG 471. CARTOGRAPHY AND GRAPHICS PRACTICUM. (3)

GEOG 472. PROBLEMS OF CARTOGRAPHIC REPRESENTATION AND PROCEDURE. (3)
Two hours lecture and two hours laboratory a week. Study of cartographic compilation methods. Principles and problems of symbolization, classification and representation of map data. Problems of representation of features at different scales and for different purposes. Place-name selection and lettering, stick-up and map composition.

GEOG 473. PROBLEMS OF MAP EVALUATION. (3)
Two hours lecture and two hours laboratory a week. Schools of topographic concepts and practices. Theoretical and practical means of determining map reliability, map utility, and source materials. Nature, status and problems of topographic mapping in different parts of the world. Nontopographic special use maps. Criteria of usefulness for purposes concerned and of reliability.

GEOG 490. GEOGRAPHIC CONCEPTS AND SOURCE MATERIALS. (3)
A comprehensive and systematic survey of geographic concepts designed exclusively for teachers. Stress will be placed upon the philosophy of geography in relation to the social and physical sciences, the use of the primary tools of geography, source materials, and the problems of presenting geographic principles.

GEOG 498. TOPICAL INVESTIGATIONS. (1-3)
Independent study under individual guidance. Restricted to advanced undergraduate students with credit for at least 24 hours in geography and to graduate students. Any exception should have the approval of the chairman of the department.

GEOG 499. UNDERGRADUATE RESEARCH. (3)
Directed regional or systematic study involving several subfields of geography, including cartographic presentation, and usually requiring field work, and leading to an undergraduate thesis.

GEOLOGY

GEOL 100. INTRODUCTORY PHYSICAL GEOLOGY. (3)
A study dealing primarily with the principles of dynamical and structural geology. Designed to give a general survey of the rocks and minerals composing the earth; the movement within it; and its surface features and the agents that form them.

GEOL 102. HISTORICAL AND STRATIGRAPHIC GEOLOGY. (3)
Prerequisite: GEOL 100. A study of the earth's history as revealed through the principles of stratigraphy and the processes of physical geology, with emphasis on the formations and the geologic development of the North American continent.

GEOL 110. PHYSICAL GEOLOGY LABORATORY. (1)
One laboratory a week. May be taken concurrently with or after successful completion of GEOL 100. The basic materials and tools of physical geology stressing familiarization with rocks and minerals and the use of maps in geologic interpretations.

GEOL 112. HISTORICAL GEOLOGY LABORATORY. (1)
One laboratory a week. Concurrent registration in GEOL 102 or consent of instructor is required. The use of geologic maps and fossils in the study of the physical and biological evolution of the earth.

GEOL 120. ENVIRONMENTAL GEOLOGY. (3)
A review of geological factors underlying many environmental problems and the interactions between population and physical environment: geologic hazards, land-use planning, conservation, mineral resources, waste disposal, land reclamation and the geologic aspects of health and disease. The course is aimed at lower division students in education and liberal arts, and should be useful to any student concerned with geologic perspectives of environmental problems.

GEOL 399. RESEARCH PROBLEMS IN GEOLOGY. (1)
Open only to geology majors in their final year. The student will select and investigate with departmental assistance a specific library, laboratory or field study. A written and oral presentation of the study will determine satisfactory completion of the course.

GEOL 421. CRYSTALLOGRAPHY. (3)
Two lectures and one laboratory a week. Prerequisite: MATH 115 or consent of instructor. An introduction to the study of crystals. Stresses the theoretical and practical relationships between the internal and external properties of crystalline solids. Encompasses morphological, optical and chemical crystallography.

GEOL 422. MINERALOGY. (3)
One lecture and two laboratories a week. Prerequisite: GEOL 110 and 421 or consent of instructor. Basic elementary mineralogy with emphasis on description, identification, formation, concurrence and economic significance of approximately 150 minerals.

GEOL 423. OPTICAL MINERALOGY. (3)
One lecture and two laboratories a week. Prerequisite: GEOL 422 or consent of instructor. The optical behavior of crystals with emphasis on the theory and application of the petrographic microscope.

GEOL 431. INVERTEBRATE PALEONTOLOGY. (3)
Two lectures and one laboratory a week. Prerequisite: GEOL 102 or consent of instructor. ZOOL 102 or equivalent recommended. A systematic review of the morphology, classification, ecology, and geologic ranges of selected invertebrate groups represented in the fossil record.

GEOL 432. STRATIGRAPHIC PALEONTOLOGY. (3)
Two lectures and one laboratory a week. Prerequisite: GEOL 431. Principles of biostratigraphy, paleoecology and paleogeography. Laboratory study emphasizes significant index fossils.

GEOL 434. MICROPALEONTOLOGY. (3)
Two lectures and one laboratory a week. Prerequisite: GEOL 431 or consent of instructor. A systematic review of the morphology, classification, ecology and geologic ranges of important microfossil groups, particularly ostracodes and foraminifera.

GEOL 441. STRUCTURAL GEOLOGY. (3)
Two lectures and one laboratory a week. Prerequisite: GEOL 110 or consent of instructor. A study of the cause and nature of the physical stresses and resulting deformational responses in the earth. Laboratory exercises include crustal model studies and stereographic analysis of deformational structures.

GEOL 442. SEDIMENTATION (3)
Two lectures and one laboratory a week. Prerequisite: GEOL 110 or consent of instructor. A study of the critical variables in sedimentation systems; origin, dispersion, accumulation, and properties of sediments and sedimentary rocks. Laboratories will include the measurement and statistical analysis of sediment properties and study of sedimentation rates.

GEOL 443. IGNEOUS AND METAMORPHIC PETROLOGY. (2)
Two laboratories a week. Prerequlsite: GEOL 422 or consent of instructor. A detailed study of igneous and metamorphic rocks: petrogenesis; distributions; chemical and mineralogical relations; macroscopic descriptions and geologic significance.

GEOL 444. PETROGRAPHY. (3)
One lecture and two laboratories a week. Prerequisites: GEOL 423, 442, or consent of instructor. Microscopic thin-section studies of rocks stressing the description and classification of igneous and metamorphic rocks.

GEOL 445. PRINCIPLES OF GEOCHEMISTRY. (3)
Three lectures per week. Prerequisite: CHEM 103 or equivalent and senior standing. A survey of historical and modern theories of the origin of elements and their distributions in space, on extra-terrestrial bodies and on Earth. Discussion of the origin of igneous rocks, of the physical and chemical factors governing development and distribution of sedimentary rocks of the oceans and of the atmosphere. Organic sediments, the internal structures of Earth and the planets, the role of isotopes in geothermometry and in the solution of other problems.

GEOL 446. GEOPHYSICS. (3)
Two lectures and one laboratory a week. Prerequisite: PHYS 122 or consent of instructor. An introduction to the basic theories and principles of geophysics stressing such important applications as rock magnetism, gravity anomolies, crustal strain and earthquakes, and surveying.

GEOL 451. GROUNDWATER GEOLOGY. (3)
Prerequisite: GEOL 100 or consent of instructor. An introduction to the basic geologic parameters associated with the hydrologic cycle. Problems in the accumulation, distribution and movement of groundwater will be analyzed.

GEOL 452. MARINE GEOLOGY. (3)
Prerequisite: GEOL 100 or consent of instructor. An introduction to the essential elements of marine and estuarine geology including studies of currents, tides, waves, coastline development, shore erosion and marine and bay sedimentation.

GEOL 453. ECONOMIC GEOLOGY I—METALLIC ORE DEPOSITS. (2)
Two laboratories a week. Prerequisite: GEOL 422 or consent of instructor. A study of the geology of metallic ore deposits stressing ore-forming processes, configuration of important ore bodies, and familiarization with characteristic ore mineral suites.

GEOL 454. ECONOMIC GEOLOGY II—NON-METALLIC ORE DEPOSITS. (2)
Two laboratories a week. Prerequisite: GEOL 422 or consent of instructor. A study of the geology of non-metallic ore deposits: nitrates, phosphates, limestone, etc., and fossil fuels; coal oil, and natural gas.

GEOL 456. ENGINEERING GEOLOGY. (3)
Two lectures and one laboratory a week. Prerequisite: GEOL 110 or consent of instructor. A study of the geological problems associated with the location of tunnels, bridges, dams and nuclear reactors, slope control, and natural hazards.

GEOL 460. EARTH SCIENCE. (3)
Two lectures and one laboratory a week. Prerequisite: Permission of instructor. An interdisciplinary course designed to show how geology, meterology, physical geography, soil science, astronomy and oceanography are interrelated in the study of the earth and its environment in space. Recommended for science education undergraduates and graduate students. May not be used for credit towards geology majors.

GEOL 462. GEOLOGICAL REMOTE SENSING. (3)
One lecture and two laboratories a week. Prerequisites: GEOL 441 and GEOL 442, or GEOG 440, or consent of the instructor. An introduction to geological remote sensing including applications of aerial photographic interpretation to problems in regional geology, engineering geology, structural geology, and stratigraphy. Films, filters, and criteria used in selecting imagery are also discussed. Laboratory exercises include measurements of geologic parameters and compilation and transference of data to base maps.

GEOL 489. SPECIAL TOPICS IN EARTH SCIENCE. (1-3)
Prerequisite: GEOL 460 or equivalent.

GEOL 499. SPECIAL PROBLEMS IN GEOLOGY. (1-3)
Prerequisites: GEOL 102 and GEOL 110 or equivalent, and consent of instructor. Intensive study of a special geologic subject or technique selected after consultation with instructor. Intended to provide training or instruction not available in other courses which will ald the student's development in his field of major interest.

GERMAN

GERM 001. ELEMENTARY GERMAN FOR GRADUATE STUDENTS. (3)
Intensive elementary course in the German language designed particularly for graduate students who wish to acquire a reading knowledge.

GERM 101. ELEMENTARY GERMAN. (4)
Introduction to basic structures and pronunciation. Four recitations per week and one hour of drill. Normally leads to 102, but gifted students may be recommended for 102H.

GERM 102. ELEMENTARY GERMAN. (4)
Completion of basic structures with increased emphasis on reading and speaking skills. Normally leads to 104, but gifted students may be recommended for 104H.

H—HONORS COURSE
Limited to students who have been recommended by their 101 instructor. An accelerated course of study with completion of basic structures. Emphasis upon reading as well as oral and written expression. Four recitations per week and one (optional) laboratory hour. Fulfills the language requirement with minimum grade of "B".

GERM 104. INTERMEDIATE GERMAN. (4)

L—LITERARY
Extensive reading, discussion, and composition. Four recitations per week. (Completes Foreign Language requirement). Leads to GERM 201 or 221.

H—HONORS COURSE
Limited to students who have been recommended by their instructor in 102 or 102H or 103. Continued emphasis on reading and writing with particular attention paid to speaking skills. Student normally continues with 201, 221, or 321.

S—SCIENTIFIC
Parallel course to 104 but with emphasis on scientific rather than literary texts, with emphasis solely on developing reading skills. Fulfills the Foreign Language requirement.

GERM 111. ELEMENTARY GERMAN. (3)
Each semester; given as intensive course in summer session. Three recitations and one audio-lingual drill per week. Study of linguistic structure. Extensive drill in pronunciation and conversation.

GERM 112. ELEMENTARY GERMAN. (3)
Each semester, given as intensive course in summer session. Three recitations and one audio-lingual drill per week. Study of linguistic structure. Extensive drill in pronunciation and conversation.

H—HONORS COURSE
Three recitations and one audio-lingual drill per week. Enrollment limited to specially approved candidates from GERM 111. Students taking this course will normally continue in GERM 115.

GERM 113. REVIEW OF ELEMENTARY GERMAN. (3)
Three recitations and one audio-lingual drill per week. Limited to students who, having taken placement examination, have failed to qualify for GERM 115.

GERM 114. INTERMEDIATE LITERARY GERMAN. (3)
Three recitations per week. Given as intensive course in summer session. Prerequisite: GERM 112 or equivalent, or GERM 113.

GERM 115. INTERMEDIATE GERMAN. (3)
L—LITERARY
Three recitations per week. Given as intensive course in summer session. Prerequisite: GERM 114 or equivalent. Recommended students may enter GERM 115 from GERM 112H.

H—HONORS COURSE
For qualified students.

S—SCIENTIFIC
Prerequisite: GERM 114. Reading of technical and scientific prose.

GERM 201. CONVERSATIONAL GERMAN. (3)
Prerequisite: GERM 115. A practical language course recommended for all students continuing in German. May be taken concurrently with GERM 221.

GERM 221. INTRODUCTION TO GERMAN LITERATURE. (3)
Prerequisite: GERM 115. Required of all students who continue in advanced courses, with the exception of superior students who are permitted to bypass an introduction to German literature. May be taken concurrently with GERM 201.

GERM 301. REVIEW GRAMMAR AND COMPOSITION. (3)
Prerequisite: GERM 115 or equivalent. A thorough study of the more detailed points of German grammar with ample practice in composition.

GERM 302. REVIEW GRAMMAR AND COMPOSITION. (3)
Prerequisite: GERM 115 or equivalent. A thorough study of the more detailed points of German grammar with ample practice in composition.

GERM 311. ADVANCED CONVERSATION. (3)
Prerequisite: GERM 115 or consent of instructor. For students who wish to develop fluency and confidence in speaking the language.

GERM 312. ADVANCED CONVERSATION. (3)
Prerequisite: GERM 115 or consent of instructor. For students who wish to develop fluency and confidence in speaking the language.

GERM 321. SURVEY OF GERMAN LITERATURE. (3)
Prerequisite: GERM 115 or equivalent. A survey of the chief authors and movements in German literature.

GERM 322. SURVEY OF GERMAN LITERATURE. (3)
Prerequisite: GERM 115 or equivalent. A survey of the chief authors and movements in German literature.

GERM 397. HONORS READING (INDEPENDENT STUDY). (3)
H—HONORS
Supervised reading to be taken normally only by students admitted into the Honors Program.

GERM 398. HONORS READING COURSE. (3)
H—HONORS
Discussion of a central theme with related investigations by students. Conducted in German.

GERM 400. BIBLIOGRAPHY AND METHODS. (3)
Especially designed for German majors.

GERM 401. ADVANCED COMPOSITION. (3)
Translation from English into German, free composition, letter writing.

GERM 402. ADVANCED COMPOSITION. (3)
Translation from English into German, free composition, letter writing.

GERM 421. GERMAN CIVILIZATION (IN GERMAN). (3)
Study of the literary, educational, artistic traditions; great men, customs, and general culture.

GERM 422. GERMAN CIVILIZATION (IN GERMAN). (3)
Study of the literary, educational, artistic traditions; great men, customs and general culture.

GERM 423. GERMAN CIVILIZATION (IN ENGLISH). (3)
To be offered every second year, alternating with GERM 421, 422, German Civillzation (in German).

GERM 424. GERMAN CIVILIZATION (IN ENGLSH). (3)
To be offered every second year, alternating with GERM 421, 422, German Civilization (in German).

GERM 441. GERMAN LITERATURE OF THE EIGHTEENTH CENTURY. (3)
The main works of Klopstock, Wieland, Lessing, Herder, Goethe, Schiller.

GERM 442. GERMAN LITERATURE OF THE EIGHTEENTH CENTURY. (3)
The main works of Klopstock, Wieland, Lessing, Herder, Goethe, Schiller.

GERM 451. GERMAN LITERATURE OF THE NINETEENTH CENTURY. (3)
Study of the literary movements from romanticism to naturalism.

GERM 452. GERMAN LITERATURE OF THE NINETEENTH CENTURY. (3)
Study of the literary movements from romanticism to naturalism.

GERM 461. GERMAN LITERATURE OF THE TWENTIETH CENTURY. (3)
Prose and dramatic writings from Gerhart Hauptmann to the present. Modern literary and philosophical movements will be discussed.

GERM 462. GERMAN LITERATURE OF THE TWENTIETH CENTURY. (3)
Prose and dramatic writings from Gerhart Hauptmann to the present. Modern literary and philosophical movements will be discussed.

GERM 468. PRO-SEMINAR—SELECTED TOPICS IN GERMAN LITERATURE. (3)
Specialized study of one great German writer or of relevant topics of literary criticism.

GERM 469. PRO-SEMINAR—SELECTED TOPICS IN GERMAN LITERATURE. (3)
Specialized study of one great German writer or of relevant topics of literary criticism.

GERM 471. INTRODUCTION TO GERMANIC PHILOLOGY. (3)
An introduction to the study of Indo-European and Germanic philology. Lectures, reading and independent studies.

GERM 472. INTRODUCTION TO GERMANIC PHILOLOGY. (3)
An introduction to the study of Indo-European and Germanic philology. Lectures, reading and independent studies.

GERM 481. GERMAN LITERATURE IN TRANSLATION. (3)
The development of German literary thought and literary movements in the European context from the enlightenment through classicism and romanticism to the end of the 19th century. Emphasis on the drama and novel in English translation. No previous German course required. May not be counted in fulfillment of German major requirements.

GERM 482. GERMAN LITERATURE IN TRANSLATION. (3)
The drama and novel from the end of the 19th century to the present in English translation. No previous German course required. May not be counted in fulfillment of German major requirements.

GERM 499. DIRECTED STUDY IN GERMAN. (1-3)
For advanced students, by permission of department chairman. Course may be repeated for credit if content differs. May be repeated to a maximum of six credits.

GENERAL EDUCATION

GNED 123. COSMIC EVOLUTION. (3)
Especially appropriate for non-science students. GNED 123 and 124 treat the beginning of our universe; the formation of stars and planets; evolution of the earth and conditions for life on it; the chemical origin of life and its subsequent evolution; the development of man and his role in the universe.

GNED 124. COSMIC EVOLUTION. (3)
Prerequisite: GNED 123 or consent of one of the instructors. Continuation of topics listed for GNED 123.

GNED 260. INTRODUCTION TO URBAN STUDY. (3)
Prerequisite: Sophomore standing. History, problems and prospects of the American city. Instructional devices include urban gaming laboratory, field trips, student projects.

GNED 279. SELECTED TOPICS IN THE SOCIAL SCIENCES. (3)
A series of student-initiated seminars in the social sciences.

GNED 289. SELECTED TOPICS IN THE HUMANITIES. (3)
A series of student-initiated seminars in the humanities.

GNED 299. SELECTED TOPICS IN THE NATURAL SCIENCES. (3)
A series of student-initiated seminars in the natural sciences.

GREEK

GREK 101. ELEMENTARY GREEK. (3)
A student who has had two units of Greek in high school may register for GREK 101 for purposes of review, but not for credit.

GREK 102. ELEMENTARY GREEK. (3)
A student who has had two units of Greek in high school may register for GREK 102 for credit with departmental permission.

GREK 203. INTERMEDIATE GREEK (GRAMMAR AND READING). (3)
Prerequisite: GREK 101, 102 or equivalent.

GREK 204. INTERMEDIATE GREEK (HOMER). (3)
Prerequisite: GREK 203 or equivalent. (Hubbe)

Prerequisite for 300-level courses, GREK 204 or equivalent, except that, with the instructor's permission, a student who plans to take no more than four semesters of Greek may substitute GREK 352 for GREK 204.

GREK 351. EURIPIDES. (3)

GREK 352. THE NEW TESTAMENT. (3)

GREK 353. HERODOTUS. (3)

GREK 354. GREEK LYRIC POETRY. (3)
Prerequisite for 400-level courses, the status of advanced undergraduate or graduate and consent of the instructor.

GREK 401. THUCYDIDES. (3)

GREK 402. GREEK PHILOSOPHERS. (3)

GREK 403. GREEK TRAGEDY. (3)

GREK 404. GREEK COMEDY. (3)

GREK 405. GREEK ORATORY. (3)

GREK 406. GREEK EPIGRAPHY. (3)

GREK 499. GREEK READINGS. (3)
Prerequisite: Consent of the instructor. The reading of one or more selected Greek authors. Reports. May be repeated with different content.

GOVERNMENT AND POLITICS

GVPT 100. PRINCIPLES OF GOVERNMENT AND POLITICS. (3)
A study of the basic principles and concepts of political science. This course may be used to satisfy, in part, the Social Science requirement in the General Education Program.

GVPT 170. AMERICAN GOVERNMENT. (3)
This course is designed as the basic course in government and it or its equivalent is a prerequisite to other courses in the department as specified in the catalog. It is a comprehensive study of government in the United States—national, state and local.

GVPT 220. INTRODUCTION TO POLITICAL BEHAVIOR. (3)
Prerequisite: GVPT 170. Development, concepts and techniques of the behavioral approach to political science. Comparison with traditional approaches.

GVPT 240. POLITICAL IDEOLOGIES. (3)
Prerequisite: GVPT 170. A survey and analysis of the leading ideologies of the modern world, including anarchism, communism, socialism, fascism, nationalism, and democracy.

GVPT 260. STATE AND LOCAL GOVERNMENT. (3)
Prerequisite: GVPT 170. A study of the functioning and problems of state and local government in the United States, with illustrations from Maryland jurisdictions.

GVPT 272. THE POLITICS OF RACE RELATIONS IN THE UNITED STATES. (3)
Political dimension of historical and contemporary racial cleavage in the United States with particular emphasis on the post World War II period.

GVPT 280. COMPARATIVE POLITICS AND GOVERNMENTS. (3)
An introduction to the field of comparative politics including exposure to the analytic frameworks through which comparative studies of politics and governmental institutions can be undertaken and a survey of the salient types of political systems.

GVPT 300. INTERNATIONAL POLITICAL RELATIONS. (3)
A study of the major factors underlying international relations, the methods of conducting foreign relations, the foreign policies of the major powers, and the means of avoiding or alleviating international conflicts. This course may be used to satisfy, in part, the Social Science requirement in the General Education Program.

GVPT 375. ACADEMIC FIELD RESEARCH IN GOVERNMENT AND POLITICS. (6)
Field research is based on the data gathered by the student during his internship assignment. Students conduct a major research project on a subject of interest to modern, theoretical political science based on a research design approved by an acedemic adviser. The course is open only to Government and Politics majors and intended to be taken concurrently with GVPT 377. The research conducted under GVPT 375 will be substantially different from the project done for GVPT 376.

GVPT 376. APPLIED FIELD RESEARCH IN GOVERNMENT AND POLITICS. (6)
Students in this course participate as interns in an agency of government or in some other appropriate political organization. Assignments are arranged to provide students with insights in both theoretical and practical aspects of politics. Under the tutelage of the host agency and an academic adviser, students conduct a major research project of mutual interest to the student and his host agency in the field of government and politics. The course is open only to Government and Politics majors and must be taken concurrently with GVPT 377.

GVPT 377. SEMINAR FOR ACADEMIC INTERNS. (3)
This seminar stresses the application of major concepts of political science as they apply to the realities of the political process. Readings and discussion attempt to relate the experiences of the academic interns to ap-

propriate literature on the subject of political decision-making. This course is open only to Government and Politics majors and is intended for students concurrently enrolled in GVPT 376 and or GVPT 375.

GVPT 388. TOPICAL INVESTIGATIONS. (3)
Independent research and writing on selected topics in Government and Politics. Prerequisite of upper division standing and consent of the instructor. This course may be taken not more than twice for academic credit towards graduation.

GVPT 390. HONORS SEMINAR IN AMERICAN GOVERNMENT AND PUBLIC ADMINISTRATION. (3)
H—HONORS
Prerequisite: Admission to Honors Program. Directed reading, reporting and discussion on the major materials of historical and contemporary relevance in the fields of American government and public administration.

GVPT 391. HONORS SEMINAR IN COMPARATIVE GOVERNMENT AND INTERNATIONAL RELATIONS. (3)
H—HONORS
Prerequisite: Admission to Honors Program. Directed reading, reporting and discussion centering on the major materials of historical and contemporary relevance in the fields of comparative government and international relations.

GVPT 392. HONORS SEMINAR IN PUBLIC LAW AND POLITICAL THEORY. (3)
H—HONORS
Prerequisite: Admission to Honors Program. Directed reading, reporting and discussion centering on the major materials of historical and contemporary relevance in the fields of public law and political theory.

GVPT 393. HONORS SEMINAR IN PUBLIC POLICY, POLITICAL BEHAVIOR, AND METHODOLOGY. (3)
H—HONORS
Prerequisite: Admission to Honors Program. Directed reading, reporting and discussion centering on the major materials of historical and contemporary relevance in the fields of public policy and political behavior.

GVPT 397. HONORS RESEARCH. (3)
H—HONORS
Prerequisite: Admission to Honors Program. Individual and research. In his last semester each student prepares an original paper.

GVPT 399. SEMINAR IN GOVERNMENT AND POLITICS. (3)
Reading, research, discussion, analysis, and writing in the area of politics. Both substantive issues and methodo'ogical approaches will be considered. Primarily for government and politics undergraduate majors. Not open to graduate students.

GVPT 401. PROBLEMS OF WORLD POLITICS. (3)
Prerequisite: GVPT 170. A study of governmental problems of international scope, such as causes of war, problems of neutrality, and propaganda. Students are required to report on readings from current literature.

GVPT 402. INTERNATIONAL LAW. (3)
Prerequisite: GVPT 170. A study of the basic character, general principles and specific rules of international law, with emphasis on recent and contemporary trends in the field and its relation to other aspects of international affairs.

GVPT 410. PRINCIPLES OF PUBLIC ADMINISTRATION. (3)
Prerequisite: GVPT 170. A study of public administration in the United States giving special attention to the principles of organization and management and to fiscal, personnel, planning, and public relations practices.

GVPT 411. PUBLIC PERSONNEL ADMINISTRATION. (3)
Prerequisite: GVPT 410 or BSAD 360. A survey of public personnel administration, including the development of merit civil service, the personnel agency, classification, recruitment, examination techniques, promotion, service ratings, training, discipline, employee relations, and retirement.

GVPT 412. PUBLIC FINANCIAL ADMINISTRATION. (3)
Prerequisite. GVPT 410 or ECON 450. A survey of governmental financial procedures, including processes of current and capital budgeting, the administration of public borrowing, the techniques of public purchasing, and the machinery of control through pre-audit and post-audit.

GVPT 413. GOVERNMENTAL ORGANIZATION AND MANAGEMENT. (3)
Prerequisite: GVPT 410. A study of the theories of organization and management in American government with emphasis on new trends, experiments and reorganizations.

GVPT 414. ADMINISTRATIVE LAW. (3)
Prerequisite: GVPT 170. A study of the discretion exercised by administrative agencies, including analysis of their functions, their powers over persons and property, their procedures, and judicial sanctions and controls.

GVPT 417. COMPARATIVE STUDY OF PUBLIC ADMINISTRATION. (3)
Prerequisite: GVPT 280 or 410, or consent of instructor. An introduction to the study of governmental administrative systems viewed from the standpoint of comparative typologies and theoretical schemes useful in cross-national comparisons and empirical studies of the politics of the administrative process in several nations. Both Western and Nonwestern countries are included.

GVPT 422. QUANTITATIVE POLITICAL ANALYSIS. (3)
Prerequisite: GVPT 220, or consent of instructor. Introduction to quantitative methods of data analysis, including selected statistical methods, block analysis, content analysis, and scale construction.

GVPT 426. PUBLIC OPINION. (3)
Prerequisite: GVPT 170. An examination of public opinion and its effect on political action, with emphasis on opinion formation and measurement, propaganda and pressure groups.

GVPT 427. POLITICAL SOCIOLOGY. (3)
Prerequisite: GVPT 220, or consent of instructor. A study of the societal aspects of political life including selected aspects of the sociology of group formation and group dynamics, political association, community integration and political behavior presented in the context of the societal environments of political systems.

GVPT 429. PROBLEMS IN POLITICAL BEHAVIOR. (3)
Prerequisite: GVPT 170. The problem approach to political behavior with emphasis on theoretical and empirical studies on selected aspects of the political process.

GVPT 431. INTRODUCTION TO CONSTITUTIONAL LAW. (3)
Prerequisite: GVPT 170. A systematic inquiry into the general principles of the American constitutional system, with special reference to the role of the judiciary in the interpretation and enforcement of the federal constitution.

GVPT 432. CIVIL RIGHTS AND THE CONSTITUTION. (3)
Prerequisite: GVPT 431. A study of civil rights in the American constitutional context, emphasizing freedom of religion, freedom of expression, minority discrimination, and the rights of defendants.

GVPT 433. THE JUDICIAL PROCESS. (3)
Prerequisite: GVPT 170. An examination of judicial organization in the United States at all levels of government, with some emphasis on legal reasoning, legal research and court procedures.

GVPT 434. RACE RELATIONS AND PUBLIC LAW. (3)
Prerequisite: GVPT 170. A political and legal examination of the constitutionally protected rights affecting racial minorities and of the constitutional power of the Federal Courts, Congress, and the Executive to define, protect and extend these rights.

GVPT 435. JUDICIAL BEHAVIOR. (3)
A study of judicial decision making at the state and

national levels, drawing primarily on the more recent quantitative and behavioral literature.

GVPT 441. HISTORY OF POLITICAL THEORY—ANCIENT AND MEDIEVAL. (3)
Prerequisite: GVPT 170. A survey of the principal political theories set forth in the works of writers before Machiavelli.

GVPT 442. HISTORY OF POLITICAL THEORY—MODERN AND RECENT. (3)
Prerequisite: GVPT 170. A survey of the principal political theories set forth in the works of writers from Machiavelli to J. S. Mill.

GVPT 443. CONTEMPORARY POLITICAL THEORY. (3)
Prerequisite: GVPT 441 or 442. A survey of the principal political theories and ideologies from Karl Marx to the present.

GVPT 444. AMERICAN POLITICAL THEORY. (3)
Prerequisite: GVPT 170. A study of the development and growth of American political concepts from the colonial period to the present.

GVPT 445. RUSSIAN POLITICAL THOUGHT. (3)
Prerequisite: GVPT 170. A survey and analysis of political ideas in Russia and the Soviet Union from early times to the present.

GVPT 448. NON-WESTERN POLITICAL THOUGHT. (3)
Political thought originating in Asia, the Middle East, and Africa. This is not a survey of all non-Western political thought, but a course to be limited by the professor with each offering. When repeated by a student, consent of instructor is required.

GVPT 450. COMPARATIVE STUDY OF FOREIGN POLICY FORMATION. (3)
Prerequisite: GVPT 280 or 300, or consent of instructor. An introduction to the comparative study of foreign policy formation structures and processes followed by a survey of the domestic sources of policy for major states. A conspectus of substantive patterns of foreign policy in analytically salient types of systems is presented. Domestic and global systemic sources of foreign policy are compared.

GVPT 451. FOREIGN POLICY OF THE U.S.S.R. (3)
Prerequisite: GVPT 170. A study of the development of the foreign policy of the Soviet Union, with attention paid to the forces and conditions that make for continuities and changes from Tsarist policies.

GVPT 452. INTER-AMERICAN RELATIONS. (3)
Prerequisite: GVPT 170. An analytical and historical study of the Latin-American policies of the United States and of problems in our relations with individual countries, with emphasis on recent developments.

GVPT 453. RECENT EAST ASIAN POLITICS. (3)
Prerequisite: GVPT 170. The background and interpretation of recent political events in East Asia and their influence on world politics.

GVPT 454. CONTEMPORARY AFRICAN POLITICS. (3)
Prerequisite: GVPT 170. A survey of contemporary development in the international politics of Africa, with special emphasis on the role of an emerging Africa in world affairs.

GVPT 455. CONTEMPORARY MIDDLE EASTERN POLITICS. (3)
Prerequisite: GVPT 170. A survey of contemporary development in the international politics of the Middle East, with special emphasis on the role of emerging Middle East nations in world affairs.

GVPT 457. AMERICAN FOREIGN RELATIONS. (3)
Prerequisite: GVPT 170. The principles and machinery of the conduct of American foreign relations, with emphasis on the Department of State and the Foreign Service, and an analysis of the major foreign policies of the United States.

GVPT 460. STATE AND LOCAL ADMINISTRATION. (3)
Prerequisite: GVPT 170. A study of the administrative structure, procedures and policies of state and local governments with special emphasis on the state level and on intergovernmental relationships, and with illustrations from Maryland governmental arrangements.

GVPT 461. METROPOLITAN ADMINISTRATION. (3)
Prerequisite: GVPT 170. An examination of administrative problems relating to public services, planning and coordination in a metropolitan environment.

GVPT 462. URBAN POLITICS. (3)
Urban political process and institutions considered in the light of changing social and economic conditions.

GVPT 473. LEGISLATURES AND LEGISLATION. (3)
Prerequisite: GVPT 170. A comprehensive study of legislative organization procedure and problems. The course includes opportunities for student contact with Congress and with the Legislature of Maryland.

GVPT 474. POLITICAL PARTIES. (3)
Prerequisite: GVPT 170. A descriptive and analytical examination of American political parties, nominations, elections, and political leadership.

GVPT 475. THE PRESIDENCY AND THE EXECUTIVE BRANCH. (3)
Prerequisite: GVPT 170. An examination of the executive, legislative and party roles of the president in the political process.

GVPT 479. PROBLEMS OF AMERICAN PUBLIC POLICY. (3)
Prerequisite: GVPT 170. The background and interpretation of various factors which affect the formation and execution of American public policy.

GVPT 480. COMPARATIVE POLITICAL SYSTEMS. (3)
Prerequisite: GVPT 280 and at least one other course in comparative government. A study, along functional lines, of major political institutions, such as legislatures, executives, courts, bureaucracies, public organizations, and political parties.

GVPT 481. GOVERNMENT AND ADMINISTRATION OF THE SOVIET UNION. (3)
Prerequisite: GVPT 170. A study of the adoption of the communist philosophy by the Soviet Union, of its governmental structure and of the administration of government policy in the Soviet Union.

GVPT 482. GOVERNMENT AND POLITICS OF LATIN AMERICA. (3)
Prerequisite: GVPT 170. A comparative study of the governmental systems and political processes of the Latin American countries, with special emphasis on Argentina, Brazil, Chile, and Mexico.

GVPT 483. GOVERNMENT AND POLITICS OF ASIA. (3)
Prerequisite: GVPT 280 or 453, or HIST 261, or 262 or HIFN 442, or 445. A comparative study of the political systems of China, Japan, India and other selected Asian countries.

GVPT 484. GOVERNMENT AND POLITICS OF AFRICA. (3)
Prerequisite: GVPT 170. A comparative study of the governmental systems and political processes of the African countries, with special emphasis on the problems of nation-building in emergent countries.

GVPT 485. GOVERNMENT AND POLITICS OF THE MIDDLE EAST. (3)
Prerequisite: GVPT 170. A comparative study of the governmental systems and political processes of the Middle Eastern countries, with special emphasis on the problems of nation-building in emergent countries.

GVPT 486. COMPARATIVE STUDIES IN EUROPEAN POLITICS. (3)
Prerequisite: GVPT 280, or consent of instructor. A comparative study of political processes and governmental forms in selected European countries.

GVPT 487. THE GOVERNMENT AND POLITICS OF SOUTH ASIA. (3)
Political systems and governments of such countries as India, Pakistan, Bangla Desh, Ceylon, and Nepal.

GVPT 492. THE COMPARATIVE POLITICS OF RACE RELATIONS. (3)
Impact of government and politics on race relations in various parts of the world. The origins, problems, and manifestations of such racial policies as segregation, apartheid, integration, assimilation, partnership, and non-racialism will be analyzed.

HEBREW

HEBR 101. INTENSIVE ELEMENTARY HEBREW. (4)
Five hours per week. Limited to students with no reading knowledge of Hebrew. Modern Israeli Hebrew. Emphasis on conversation. Study of linguistic structure and development of audio-lingual, writing and reading ability. Credit may not be earned for both HEBR 101 and HEBR 111.

HEBR 111. ELEMENTARY HEBREW. (3)
Three recitations per week and one drill hour. Modern Israeli Hebrew. Emphasis on conversation. Study of linguistic structure and development of audio-lingual, writing and reading ability.

HEBR 112. ELEMENTARY HEBREW. (3)
Three recitations per week and one drill hour. Prerequisite: HEBR 111 or 101 or equivalent. Modern Israeli Hebrew. Emphasis on conversation. Study of linguistic structure and development of audio-lingual, writing and reading ability.

HEBR 114. INTERMEDIATE HEBREW. (3)
Three recitations per week and one drill hour. Prerequisite: HEBR 112 or equivalent. Study of linguistic structure, further development of audio-lingual, reading, writing, and speaking skills. Reading of texts and newspapers designed to give some knowledge of Hebrew life, thought and culture.

HEBR 115. INTERMEDIATE HEBREW. (3)
Three recitations per week and one drill hour. Prerequisite: HEBR 114 or equivalent. Completion of study of linguistic structure, further development of audio-lingual, reading, writing, and speaking skills. Reading of texts and newspapers designed to give some knowledge of Hebrew life, thought and culture.

HEBR 201. CONVERSATION AND COMPOSITION. (3)
Prerequisite: HEBR 115 or equivalent. A practical language course recommended for all students continuing with Hebrew. Review of grammar and composition. Selected readings. Oral and written exercises.

HEBR 301. CONVERSATION AND COMPOSITION. (3)
Prerequisite: HEBR 201 or equivalent. A practical language course recommended for all students continuing with Hebrew. Review of grammar and composition. Selected readings. Oral and written exercises.

HEBR 321. SURVEY OF HEBREW LITERATURE. (3)
Prerequisite: HEBR 115 or equivalent. From the Haskalah (enlightenment) until the renaissance of modern Hebrew. From Mendelsohn to Mendele Mocher Seforim and Sholom Eleichem. Readings in Hebrew. Discussion may be in English. Students with insufficient Hebrew preparation may receive permission to audit.

HEBR 322. SURVEY OF HEBREW LITERATURE. (3)
Prerequisite: HEBR 115 or equivalent. From the modern Hebrew revival period until today. Bialik, Peretz, Agnon and contemporary writers. Readings in Hebrew. Discussion may be in English. Students with insufficient Hebrew preparation may receive permission to audit.

HEBR 333. HEBREW CIVILIZATION (IN ENGLISH). (3)
Major trends in the cultural, social, and literary history of the Jews from their earliest experiences as a people up to the present.

HEBR 334. HEBREW CIVILIZATION (IN ENGLISH). (3)
Major trends in the cultural, social, and literary history of the Jews from their earliest experiences as a people up to the present.

HEBR 421. THE HEBREW BIBLE. (3)
Selected readings from the Torah and commentaries. The Bible in the context of the civilizations of the ancient Middle East. Comparison of the essential elements of Israelite religion and contemporary Paganism. Major concepts of Jewish thought derived by traditional commentators from analysis of the biblical text. Emphasis upon the ideas of the Bible, the human problems which it attempts to answer, and the institutions which embody those ideas.

HEBR 422. THE HEBREW BIBLE (3)
Continuation of HEBR 421.

HEBR 431. MODERN AND CONTEMPORARY HEBREW LITERATURE. (3)
The period of the Haskalah (enlightenment) and the period of the Tehiah (modern revival).

HEBR 432. MODERN AND CONTEMPORARY HEBREW LITERATURE. (3)
Readings in problems facing modern man as reflected in the writings of Agnon, Burla, Berkowitz, Mosensohn, etc. Training in literary criticism. Reading of periodicals dealing with modern literary criticism.

HEBR 441. STUDIES IN CLASSICAL HEBREW. (3)
Linguistic peculiarities of classical Hebrew style from pre-biblical epigraphc records to the Dead Sea Scrolls. Applies the method of literary form criticism to poetry and songs, cultic formulae, historical annals and narratives. Prerequisite: HEBR 301.

HEBR 442. STUDIES IN CLASSICAL HEBREW. (3)
Pentateuchal source analysis, prophetic oracles, biblical law in comparison with other ancient codes, wisdom literature, the apocalyptic form and the manual of discipline of the Dead Sea Scrolls. Prerequisite: HEBR 301.

HEARING AND SPEECH SCIENCES

HESP 202. FUNDAMENTALS OF HEARING AND SPEECH SCIENCE. (3)
Introduction to phonetics, the physiological basis of speech production and reception, and the physics of sound. Required of majors in hearing and speech sciences and recommended for majors in education and psychology.

HESP 302. SPEECH PATHOLOGY I. (3)
For majors. Prerequisite: HESP 202. Etiology, assessment, and treatment of articulation disorders.

HESP 305. ANATOMY AND PHYSIOLOGY OF THE SPEECH MECHANISM. (3)
Prerequisite: HESP 202. Anatomy, physiology, and neurology of speech mechanism. Physiological phonetics.

HESP 310. SEMANTIC ASPECTS OF SPEECH IN HUMAN RELATIONS. (3)
Prerequisite: HESP 202. An analysis of speech and language habits from the standpoint of general semantics.

HESP 312. INSTRUMENTATION IN HEARING AND SPEECH SCIENCE. (3)
Prerequisite: HESP 202. Principles of operation of electronic equipment in the speech and hearing clinic.

HESP 314. INTRODUCTION TO AUDIOLOGY.
Prerequisite: HESP 202. Physics of sound, anatomy and physiology of hearing; introduction to measurement and to rehabilitation of the hearing-handicapped.

HESP 400. SPEECH AND LANGUAGE DEVELOPMENT OF CHILDREN. (3)
Prerequisite: HESP 202. Analysis of normal processes of speech and language development in children.

HESP 401. SURVEY OF SPEECH DISORDERS. (3)
For non-majors. Prerequisite: HESP 202. Communication disorders in school children. Graduate credit applicable only in the College of Education.

HESP 403. INTRODUCTION TO PHONETIC SCIENCE. (3)
Prerequisite: HESP 202. Phonetic transcription and phonetic principles. Acoustical and perceptual phonetics.

HESP 404. SPEECH PATHOLOGY II. (3)
Prerequisites: HESP 302, 305. Etiology and therapeutic management of cleft palate and stuttering.

HESP 406. SPEECH PATHOLOGY III. (3)
Prerequisite: HESP 302, 305. Etiology and therapeutic management of aphasia and delayed language.

HESP 408. CLINICAL PRACTICE. (1-2)
Prerequisite: permission of instructor. Observation and participation in the speech and hearing clinic. Repeatable for a maximum of two credits.

HESP 410. PRINCIPLES AND METHODS IN SPEECH THERAPY. (3)
Prerequisite: HESP 404 or 406. Comparative methods in the clinical management of speech problems.

HESP 412. REHABILITATION OF THE HEARING HANDICAPPED. (3)
Prerequisite: HESP 314. Speech reading, auditory training, and speech training for hard-of-hearing children and adults.

HESP 414. SEMINAR. (3)
Prerequisite: permission of instructor. Individual projects in phonetic science, speech pathology, and audiology.

HISTORY, FOREIGN

HIFN 374. TWENTIETH CENTURY ALGERIA. (3)
A brief survey of the history of Algeria and an indepth study of twentieth century events leading up to and including the war of liberation and Algerian independence. Reading knowledge of French desirable.

HIFN 401. THE HISTORY OF SPAIN. (3)
Political, social and economic development of Spain; the Spanish empire; Spain's role in Europe. Some attention will be paid to Portuguese history. First semester: 1469-1700.

HIFN 402. THE HISTORY OF SPAIN. (3)
Political, social and economic development of Spain; the Spanish empire; Spain's role in Europe. Some attention will be paid to Portuguese history. Second semester: 1700 to present.

HIFN 403. DIPLOMATIC HISTORY OF LATIN AMERICA. (3)
A survey of the political, economic and cultural relations of the Latin American nations with emphasis on their relations with the United States and the development of the inter-American system.

HIFN 404. HISTORY OF CANADA. (3)
Prerequisites: HIST 241, 242 or HIST 253, 254. A history of Canada, with special emphasis on the nineteenth century and upon Canadian relations with Great Britain and the United States.

HIFN 405. HISTORY OF BRAZIL. (3)
The history of Brazil with emphasis on the national period.

HIFN 406. THE HISTORY OF MEXICO AND THE CARIBBEAN TO 1810. (3)
The history of Mexico, Central America and the Antilles, beginning with the pre-Spanish Indian cultures and continuing through the Spanish colonial period and the national period to the present day. The division point between the two courses in the year 1810, the beginning of the Mexican wars for independence.

HIFN 407. THE HISTORY OF MEXICO AND THE CARIBBEAN, 1810 TO THE PRESENT. (3)
The history of Mexico, Central America and the Antilles, beginning with the pre-Spanish Indian cultures and continuing through the Spanish colonial period and the national period to the present day. The division point between the two courses is the year 1810. The beginning of the Mexican wars for independence.

HIFN 410. HISTORY OF ROME. (3)
A study of Roman civilization from the earliest beginnings through the Republic and down to the last centuries of the Empire.

HIFN 411. HISTORY OF MEDIEVAL EUROPE. (3)
A study of medieval government, society and thought from the collapse of classical civilization to the Renaissance.

HIFN 412. HISTORY OF MEDIEVAL EUROPE. (3)
A study of medieval government, society and thought from the collapse of classical civilization to the renaissance.

HIFN 413. THE OLD REGIME AND THE FRENCH REVOLUTION, 1748-1815. (3)
Europe in the era of the French Revolution.

HIFN 414. HISTORY OF EUROPEAN IDEAS. (3)
Prerequisites: HIST 241, 242 or HIST 253, 254, or the equivalent. Beginning with a review of the basic Western intellectual traditions as a heritage from the ancient world, the courses will present selected important currents of thought from the scientific revolution of the sixteenth and seventeenth centuries down to the twentieth century. First semester, through the eighteenth century.

HIFN 415. HISTORY OF EUROPEAN IDEAS. (3)
Prerequisites: HIST 241, 242, or 253, 254, or the equivalent. Beginning with a review of the basic Western intellectual traditions as a heritage from the ancient world, the courses will present selected important currents of thought from the scientific revolution of the sixteenth and seventeenth centuries down to the twentieth century. Second semester, nineteenth and twentieth centuries.

HIFN 416. THE RENAISSANCE. (3)
City-states and the rise of nation-states, the culture and thought of the Renaissance, its impact into the seventeenth century.

HIFN 417. THE REFORMATION. (3)
Major developments from the 'pre-reformation' to the 'post-reformation'. Religion is emphasized as the fundamental motive force resulting in the reformations of the 16th century. The interaction between religious forces and the political, socio-economic, intellectual, and cultural trends of the period are also considered.

HIFN 420. HISTORY OF THE BRITISH EMPIRE. (3)
Prerequisites: HIST 241, 242 or HIST 253, 254. First semester, the development of England's mercantilist empire and its fall in the war for American Independence (1783).

HIFN 421. HISTORY OF THE BRITISH EMPIRE. (3)
Prerequisite: HIST 241, 242 or 253, 254. Second semester, the rise of the second British empire and the solution of the problem of responsible self-government (1783-1867), the evolution of the British empire into a commonwealth of nations, and the development and problems of the dependent empire.

HIFN 422. CONSTITUTIONAL HISTORY OF GREAT BRITAIN. (3)
Constitutional development in England, with emphasis on the history of the royal prerogative, the growth of the common law, the development of Parliament, and the emergence of systematized government. First semester, to 1485.

HIFN 423. CONSTITUTIONAL HISTORY OF GREAT BRITAIN. (3)
Constitutional development in England, with emphasis on the history of the royal prerogative, the growth of the common law, the development of Parliament, and the emergence of systematized government. Second semester, since 1485.

HIFN 424. HISTORY OF RUSSIA. (3)
A history of Russia from earliest times to 1917.

HIFN 425. HISTORY OF RUSSIA. (3)
A history of Russia from earliest times to 1917.

HIFN 426. EUROPE IN THE 19th CENTURY, 1815-1919. (3)
Prerequisites: HIST 241, 242 or HIST 253, 254. A study of the political, economic, social, and cultural development

of Europe from the Congress of Vienna to the First World War.

HIFN 427. EUROPE IN THE 19th CENTRY, 1815-1919. (3)
Prerequisites. HIST 241, 242 or 253, 254. A study of the political, economic, social, and cultural development of Europe from the Congress of Vienna to the First World War.

HIFN 430. EUROPE IN THE WORLD SETTING OF THE 20th CENTURY. (3)
Prerequisites. HIST 241, 242 or HIST 253, 254. A study of political, economic and cultural developments in twentieth-century Europe with special emphasis on the factors involved in the two World Wars and their global impacts and significance.

HIFN 431. EUROPE IN THE WORLD SETTING OF THE 20th CENTURY. (3)
Prerequisites: HIST 241, 242 or 253, 254 A study of political economic and cultural developments in 20th century Europe with special emphasis on the factors involved in the two World Wars and their global impacts and significance.

HIFN 432. THE SOVIET UNION. (3)
A history of the Bolshevik Revolution and the founding of the Soviet Union; the economic policy and foreign policy of the U.S.S.R. to the present.

HIFN 433. MODERN FRANCE. (3)
A survey of French history from 1815 to the present. The emphasis is upon such topics as the population problem, the economic and social structure of French society, and the changing political and cultural values of this society in response to recurrent crises through the nineteenth and twentieth centuries.

HIFN 434. TUDOR ENGLAND. (3)
An examination of the political, religious and social forces in English life, 1485-1603, with special emphasis on Tudor government, the English Reformation and the Elizabethan era.

HIFN 435. STUART ENGLAND. (3)
An examination of the political, religious and social forces in English life, 1603-1714, with special emphasis on Puritanism and the English life, 1603-1714, with special emphasis on Puritanism and the English revolutions.

HIFN 436. BRITAIN IN THE 18th CENTURY. (3)
Developments in Great Britain from the Revolution of 1688 to the end of the Napoleonic wars.

HIFN 437. MODERN BRITAIN. (3)
A survey of British history from the age of the French Revolution to World War I with emphasis upon such subjects as Britain's role in the world, the democratization of the state, the problems arising from industrialism and urbanism, and Irish and imperial problems.

HIFN 442. HISTORY OF CHINA. (3)
A history of China from earliest times to the present. The emphasis is on the development of Chinese institutions that have molded the life of the nation and its people.

HIFN 443. HISTORY OF CHINA. (3)
A history of China from earliest times to the present. The emphasis is on the development of Chinese institutions that have molded the life of the nation and its people.

HIFN 444. THE AGE OF ABSOLUTISM, 1648-1748. (3)
Europe in the Age of Louis XIV and the Enlightened Despots.

HIFN 445. HISTORY OF JAPAN. (3)
Japanese civilization from the age of Shinto mythology introduction of continental learning, and rule of military overlords.

HIFN 446. HISTORY OF JAPAN. (3)
Renewed contact with the western world and Japan's emergence as a modern state.

HIFN 448. STUDIES IN THE MIDDLE EASTERN CULTURE. (3)
Systematic treatment of aspects of literature and culture of the Middle East. May be repeated.

HIFN 450. THE MIDDLE EAST. (3)
A survey of the political, cultural and institutional history covering the period up to the tent century.

HIFN 451. THE MIDDLE EAST. (3)
A survey of the political, cultural and institutional history covering the period up from the 10th century to the beginnings of the 19th century.

HIFN 452. THE CONTEMPORARY MIDDLE EAST. (3)
This course covers the break-up of the Ottoman Empire and the emergence of contemporary states of the area.

HIFN 454. HISTORY OF THE JEWS AND THE STATE OF ISRAEL. (3)
A survey of Jewish history from the second century Diaspora to the present with special attention to an analysis of Zionism, the creation of a Jewish home in Palestine, the establishment of the State of Israel, and modern developments.

HIFN 455. HISTORY OF ARGENTINA AND THE ANDEAN REPUBLICS. (3)
The history of the nationalist period of selected South American countries.

HIFN 456. ANCIENT NEAR EAST AND GREECE. (3)
A survey of the ancient civilizations of Egypt, the Near East and Greece, with particular attention to their institutions, life, and culture.

HIFN 460. SOCIAL AND CULTURAL HISTORY OF EUROPE. (3)
An exploration of social structure, life styles, rituals, symbols, and myths of the peoples of Europe. From earliest times to 1800.

HIFN 461. SOCIAL AND CULTURAL HISTORY OF EUROPE. (3)
An exploration of social structure, life styles, rituals symbols, and myths of the peoples of Europe. The modernization of European society.

HIFN 462. GERMANY IN THE 19th CENTURY, 1815-1914. (3)
Prerequisites: Any one of the following courses: HIST 242, HIFN 421 426, 427, 433. Junior, senior, or graduate standing required, or consent of instructor. The course is intended to trace the development of modern Germany and provide a basis for the understanding of the rise of National Socialism and Germany in the 20th century.

HIFN 463. GERMANY IN THE 20th CENTURY, 1914-1945. (3)
Prerequisites: Any one of the following courses: HIST 242, HIFN 421, 426, 427, 433. Junior, senior, or graduate standing required, or consent of instructor. The course is intended to provide an understanding of Germany's aims and policies during World War I, her condition and policies in the inter-war period, the rise of National Socialism and Germany's part in World War II.

HIFN 464. 19th CENTURY EUROPEAN DIPLOMATIC HISTORY. (3)
Prerequisite: A course in 19th Century European History. The development and execution of European diplomacy from the Congress of Vienna to the outbreak of World War I concentrating on Central and Western Europe.

HIFN 465. 20th CENTURY EUROPEAN DIPLOMATIC HISTORY. (3)
Prerequisite: A course in 20th Century European History. The development and execution of European diplomacy from the outbreak of World War I to the conclusion of World War II concentrating on Central and Western Europe.

HIFN 466. BYZANTINE EMPIRE. (3)
Institutions and culture of the Byzantine Empire dealing

with the history of the East Roman Empire to the Battle of Manzikert, 1971.

HIFN 467. BYZANTINE EMPIRE. (3)
History of Byzantium from 1071 to the fall of Constantinople, 1453.

HIFN 470. EUROPEAN ECONOMIC HISTORY. (3)
Economic development of Europe from the Manorial Economy of Medieval Feudalism through the emergence of capitalist institutions and overseas empires to the advent of the industrial revolution.

HIFN 471. EUROPEAN ECONOMIC HISTORY. (3)
Begins with 1750 and continues to the present. Emphasis is on causes and consequences of industrial development in Western and Eastern Europe.

HIFN 473. A SURVEY OF AFRICAN HISTORY. (3)
A brief survey of the history of sub-Saharan Africa from prehistoric times to the end of the colonial era. Special focus on neolithic civilizations, major migrations and political and commercial developments in pre-colonial and colonial Africa.

HIFN 474. A HISTORY OF WEST AFRICA. (3)
HIFN 473 is recommended though not required. A regional study of the western Sudan, forest and coastal regions from prehistoric times to the nineteenth century. A discussion of neolithic and iron age civilizations, trans-Saharan and other trade, introduction of Islam, medieval Sudanese empires, forest kingdoms, nineteenth-century empires and kingdoms, and the impact of European penetration.

HIFN 475. ECONOMIC HISTORY OF WEST AFRICA. (3)
The economic history of West Africa from Neolithic times to the end of the Colonial era. Reading knowledge of French desirable.

HIFN 476. MODERN BALKAN HISTORY. (3)
A political, socio-economic, and cultural history of Yugoslav, Bulgaria, Romania, Greece, and Albania from the breakdown of Ottoman domination to the present. Emphasis is on movements for national liberation during the 19th century and on approaches to modernization in the 20th century.

HISTORY

HIST 217. AFRO-AMERICAN HISTORY. (3)
A survey of the Negro in American history, covering the African background, slavery, the role of the Negro in the social, political, economic, cultural and artistic life of the United States. Emphasis will be placed on the enduring themes and the black experience in American society, including contemporary problems in race relations.

HIST 221. HISTORY OF THE UNITED STATES TO 1865. (3)
A survey of the history of the United States from colonial times to the end of the Civil War. Emphasis on the establishment and development of American institutions.

HIST 222. HISTORY OF THE UNITED STATES SINCE 1865. (3)
A survey of economic, social, intellectual, and political developments since the Civil War. Emphasis on the rise of industry and the emergence of the United States as a world power.

HIST 223. SOCIAL AND CULTURAL HISTORY OF EARLY AMERICA. (3)
A study of the social and cultural history of the United States as a predominantly agricultural society. Examination of how the social milieu shapes the cultural development of the nation and its institutions.

HIST 224. SOCIAL AND CULTURAL HISTORY OF MODERN AMERICA. (3)
A study of the social and cultural history of the United States as a society in transition. Examination of the social and cultural changes that accompanied industrial and scientific development.

HIST 225. THE UNITED STATES IN WORLD AFFAIRS. (3)
A study of the United States as an emerging world power and the American response to changing status in world affairs. Emphasis on the relationship between internal and external development of the nation.

HIST 226. WOMEN IN AMERICAN SOCIETY TO 1865. (3)
A survey of the religious, legal, and cultural institutions that shaped the role and character of women in American society. The historical role played by women in the growth and development of the nation and their ongoing struggle to achieve political, economic, and social equality is examined.

HIST 227. WOMEN IN AMERICAN SOCIETY SINCE 1865. (3)
A survey of the religious, legal, and cultural institutions that shaped the role and character of women in American society. The historical role played by women in the growth and development of the nation and their ongoing struggle to achieve political, economic, and social equality is examined.

HIST 231. LATIN AMERICAN HISTORY. (3)
A survey of the history of Latin America from Colonial origins to the present, covering political, cultural, economic, and social development, with special emphasis upon relations with the United States. First semester: Colonial Latin America. Second semester: The Republics.

HIST 232. LATIN AMERICAN HISTORY. (3)
A survey of the republics, covering political, cultural, economic, and social development, with special emphasis upon relations with the United States.

HIST 241. WESTERN CIVILIZATION. (3)
This course is designed to give the student an appreciation of the civilization in which he lives in its broadest setting. The study begins with the collapse of classical civilization and comes to the present.

HIST 242. WESTERN CIVILIZATION. (3)
This course is designed to give the student an appreciation of the civilization in which he lives in its broadest setting. The study begins with collapse of classical civilization and comes to the present.

HIST 251. THE HUMANITIES. (3)
In surveying history from prehistoric times to the present, man's cultural development is emphasized. The course is a study of the achievements of the common cultural heritage of western civilization. It is designed as an introductory course in history which will make a more direct contribution to the other liberal arts fields. First semester, to the Renaissance.

HIST 252. THE HUMANITIES. (3)
The surveying history from prehistoric times to the present, man's cultural development is emphasized. The course is a study of the achievements of the common cultural heritage of western civilization. It is designed as an introductory course in History which will make a more direct contribution to the other liberal arts fields. Second semester, since the Renaissance.

HIST 253. HISTORY OF ENGLAND AND GREAT BRITAIN. (3)
A history of the development of British life and institutions. Open to all classes. Especially recommended for English majors and minors and pre-law students. First semester, to 1485.

HIST 254. HISTORY OF ENGLAND AND GREAT BRITAIN. (3)
A history of the development of British life and institutions. Open to all classes. Especially recommended for English majors and minors and pre-law students. Second semester, since 1485.

HIST 256. PRE-HONORS COLLOQUIUM IN EARLY AMERICAN HISTORY. (3)
Selected reading in early American history with emphasis on independent discussion and writing. May be

taken for credit by students exempt from American history. Permission of instructor required.

HIST 257. PRE-HONORS COLLOQUIUM IN MODERN AMERICAN HISTORY. (3)
Selected readings in modern American history with emphasis on independent study, discussion and writing. May be taken for credit by students exempt from American history. Permission of instructor required.

HIST 261. EAST ASIAN CIVILIZATION. (3)
This course seeks to give the student an understanding of a great civilization radically different from our own, and an appreciation of the complex problems of East Asia and of American policy there. The approach is interdisciplinary within a historical framework.

HIST 262. EAST ASIAN CIVILIZATION. (3)
This course seeks to give the student an understanding of a great civilization radically different from our own, and an appreciation of the complex problems of East Asia and of American policy there. The approach is interdisciplinary within a historical framework.

HIST 271. ISLAMIC CIVILIZATION I. (3)
Survey of Islamic civilization dealing with Islam as a religion and covering its major institutions. Begins with pre-Islamic Arabia and rise of Muhammad, emphasizing the life and political activities of the prophet of Islam, the basic tenets of Islam, and Islamic religious law. A survey of the sectarian development in early Islam is included.

HIST 272. ISLAMIC CIVILIZATION II. (3)
Survey of Islamic institutions, religious and political, dealing with the administration of the Muslim Empire and examining the development of the judicial and executive branches of government. Within the framework of the religious institutions, the development of Islamic jurisprudence and theology are briefly discussed. A short survey of Islamic mysticism is included.

HIST 298. SPECIAL TOPICS IN HISTORY. (3)

HIST 325. THE RUSSIAN REVOLUTIONS OF 1917. (3)
A close examination of the historical background, the doctrines, the immediate causes, the events, and the results of the February and October revolutions.

HIST 350. MODERN CHURCH HISTORY. (3)
Introduction to major developments and problems of modern church history primarily in Europe from the 'waning' of the confessional age in the 17th and 18th centuries through the 20th century.

HIST 351. HISTORY OF RELIGION IN AMERICA. (3)
A history of religion, religious movements, and churches in America from the early Colonial period to the present, with special attention to the relation of church and society.

HIST 389. PROSEMINAR IN HISTORICAL WRITING. (3)
Discussions and research papers designed to acquaint the student with the methods and problems of research and presentation. The student will be encouraged to examine those phases of history which he regards as his specialties.

HIST 395. HONORS COLLOQUIUM. (3)
Enrollment limited to students admitted by the departmental honors committee. Reading in sources and secondary work centering about the development of the modern world. Discussions of reading and written work in weekly seminar meetings.

HIST 396. HONORS COLLOQUIUM. (3)
Enrollment limited to students admitted by the departmental honors committee. Reading in sources and secondary work centering about the development of the modern world. Discussions of reading and written work in weekly seminar meetings.

HIST 398. SPECIAL TOPICS IN HISTORY. (3)

HIST 399. HONORS THESIS. (3)
Limited to students who have completed HIST 395. Normally repeated for a total of six hours credit during the senior year by candidates for honors in history.

HIST 401. THE SCIENTIFIC REVOLUTION—FROM COPERNICUS TO NEWTON (3)
Major developments in the history of physics and astronomy during the 16th and 17th centuries and critical evaluations of the Copernican Revolution, the "mechanical philosophy" of the 17th-century scientists, and the Newtonian synthesis and its impact on 18th-century thought.

HIST 402. THE DEVELOPMENT OF MODERN PHYSICAL SCIENCE—FROM LAVOISTER TO EINSTEIN. (3)
Prerequisites: MATH 110 and PHYS 112 or 117. History of chemistry, physics and geology during the period from about 1775 to about 1925.

HIST 403. HISTORY OF TECHNOLOGY. (3)
A survey course designed for junior, senior and graduate students with a solid base in either engineering or history; it will cover the time span from Greek antiquity to the First World War. Technology will be studied as a cultural force controlled by laws of its own and operating within a distinctive conceptual framework. The course will concentrate on the changing character of technology in history and on the interactions between technology and other cultural forces such as science, philosophy, art, material culture, and the economy.

HIST 404. HISTORY OF MODERN BIOLOGY. (3)
The internal development of biology from about 1750 to about 1940 will be covered, including evolution, cell theory, genetics, enzymes, and biochemistry, and the origins of anthropology and experimental psychology. The social circumstances under which biology arose and prospered, the philosophical aspects of some debates, the technical achievements enabling new research, and the influences of other sciences on biology will also be discussed.

HIST 405. HISTORY OF EARLY MEDICINE: FROM THAUMATURGY AND THEURGY TO THE 17th CENTURY THEORIES. (3)
A historical survey of the development of medicine in Europe and Asia from earliest times to the 18th century. Topic discussed include: primitive diseases, Egyptian, Chinese, Greek and medieval medicine, epidemics, surgical developments, the physician and the development of of public health administration. Enrollment limited to upper division and graduate students.

HIST 406. HISTORY OF THE EMERGENCE OF MODERN MEDICINE. (3)
Prerequisite: Junior standing. Development of modern medicine from the 18th century to the present with emphasis on the United State, including American Indian medicine, growth of medical professions, hospitals and public health facilities, surgery, clinical medicine, psychiatry and modern medical specialization.

HIST 408. SELECTED TOPICS IN WOMEN'S HISTORY. (3)
Prerequsites: HIST 226 or HIST 227 or permission of the instructor. Indepth study of selected topics on women in American society including such areas as women and the law, women and politics, the 'feminine mystique', and the 'new feminism'. May be repeated to a maximum of six semester hours.

HIST 498. SPECIAL TOPICS IN HISTORY. (3)
May be repated to a maximum of nine hours.

HISTORY, UNITED STATES

HIUS 401. AMERICAN COLONIAL HISTORY. (3)
The settlement and development of colonial America to the middle of the eighteenth century.

HIUS 402. THE AMERICAN REVOLUTION. (3)
The background and course of the American Revolution through the formation of the Constitution.

HIUS 403. THE FORMATIVE PERIOD IN AMERICA, 1789-1824. (3)
The evolution of the Federal government, the origins of

political parties, problems of foreign relations in an era of international conflict, beginnings of the industrial revolution in America, and the birth of sectionalism.

HIUS 404. ECONOMIC HISTORY OF THE UNITED STATES. (3)
The development of the American economy and its institutions. First semester, to 1865.

HIUS 405. ECONOMIC HISTORY OF THE UNITED STATES. (3)
The development of the American economy and its institutions. Second semester, since 1865.

HIUS 406. SOCIAL HISTORY OF THE UNITED STATES. (3)
Formation of regional societies; immigration and nativism; the Negro; urban movement; social responses to technological change. First semester, to 1865.

HIUS 407. SOCIAL HISTORY OF THE UNITED STATES. (3)
Formation of regional societies; immigration and nativism; the Negro; urban movement; social responses to technological change. Second semester, from 1865.

HIUS 410. THE MIDDLE PERIOD OF AMERICAN HISTORY, 1824-1880. (3)
An examination of the political history of the United States from Jackson to Lincoln with particular emphasis on the factors producing Jacksonian democracy, Manifest Destiny, the Whig Party, the anti-slavery movement, the Republican Party, and secession.

HIUS 411. THE CIVIL WAR. (3)
Military aspects; problems of the Confederacy; political, social and economic effects of the war upon American society.

HIUS 412. RECONSTRUCTION AND THE NEW NATION, 1865-1896. (3)
Prerequisite: Six credits of American history, or permission of instructor. Problems of reconstruction in both South and North. Emergence of big business and industrial combinations. Problems of the farmer and laborer.

HIUS 413. THE PROGRESSIVE PERIOD—THE UNITED STATES 1896-1919. (3)

HIUS 414. BETWEEN THE WARS—THE UNITED STATES 1919-1945. (3)

HIUS 415. THE UNITED STATES SINCE WORLD WAR II. (3)
Problems and issues of American society, foreign and domestic, of the past generation.

HIUS 416. BLACKS IN AMERICAN LIFE—1865 TO THE PRESENT. (3)
The role of the Black in America since slavery, with emphasis on twentieth-century developments: the migration from farm to city; the growth of the civil rights movement; the race question as a national problem.

HIUS 420. HISTORY OF THE SOUTH. (3)
Prerequisite: HIST 221, 222, or equivalent. The golden age of the Chesapeake, the institution of slavery, the antebellum plantation society, the experience of defeat, the impact of industrialization, and the modern racial adjustment.

HIUS 421. HISTORY OF THE SOUTH. (3)
Prerequisite: HIST 221, 222 or equivalent. The golden age of the Chesapeake. The institution of slavery, the antebellum plantation society, the experience of defeat, the impact of industrialization, and the modern racial adjustment.

HIUS 422. DIPLOMATIC HISTORY OF THE UNITED STATES. (3)
A historical study of the diplomatic negotiations and foreign relations of the United States. First semester, from the Revolution to 1898. Second semester, from 1898 to the present. Students who have taken HIST 225 are admitted only by permission of instructor.

HIUS 423. DIPLOMATIC HISTORY OF THE UNITED STATES. (3)
A historical study of the diplomatic negotiations and foreign relations of the United States. Second semester, from 1898 to the present. Students who have taken HIST 225 are admitted only by permission of instructor.

HIUS 424. THE HISTORY OF IDEAS IN AMERICA. (3)
A history of basic beliefs about religion, man, nature, and society.

HIUS 425. THE HISTORY OF IDEAS IN AMERICA. (3)
A history of basic beliefs about religion, man, nature, and society.

HIUS 426. CONSTITUTIONAL HISTORY OF THE UNITED STATES. (3)
A study of the historical forces resulting in the formation of the Constitution, and development of American constitutionalism in theory and practice thereafter.

HIUS 427. CONSTITUTIONAL HISTORY OF THE UNITED STATES. (3)
A study of the historical forces resulting in the formation of the constitution, and development of American constitutionalism in theory and practice thereafter.

HIUS 430. HISTORY OF MARYLAND. (3)
Political, social and economic history of Maryland from seventeenth century to the present.

HIUS 432. A CULTURAL AND SOCIAL HISTORY OF THE AMERICAN WORKER. (3)
Examines the free American working class in terms of its composition; its myths and utopias; its social conditions; and its impact on American institutions.

HIUS 433. HISTORY OF THE AMERICAN FRONTIER. (3)
Major historical interpretation of the significance to the period of the Trans-Allegheny West. Assesses the impact of the frontier experience on American history. Equal attention is given to political, economic, social and cultural problems associated with the development of the west. Indian culture, treatment of the Indians, and Indian-White relations are integrated into the course through readings and lectures.

HIUS 434. HISTORY OF THE AMERICAN FRONTIER. (3)
Exploration, settlement and development of the Trans-Mississippi West. Assesses the impact of the frontier experience on American history. Equal attention is given to political, economic, social and cultural problems associated with the development of the west. Indian culture, treatment of the Indians, and Indian-White relations are integrated into the course through readings and lectures.

HEALTH

HLTH 105. SCIENCE AND THEORY OF HEALTH. (2)
A course concerned primarily with sound health knowledge, attitudes and behaviors as they apply to the individual. The major subjects dealt within this course are: mental health and social adjustment; human reproduction and sex education; organic efficiency; ecology and health; and the need for health education and community action for health from local to world levels.

HLTH 106. DRUG USE AND ABUSE. (3)
In interdisciplinary analysis of contemporary drug issues and problems. The course will examine physiological, psychological, social, philosophical, historical, legal and health aspects of drug use and abuse. Special attention will be focused on those general motivations for drug use that attend life on the college campus.

HLTH 110. ORIENTATION TO HEALTH EDUCATION. (1)
This course explores the field of health education in both the school and the community from the point of view of the health educator. Professional preparation and career opportunities are considered.

HLTH 130. INTRODUCTION TO HEALTH. (3)
Development of understanding and appreciation of the historic and significant purpose and place of each of the specialized health areas in general education. A study of the educational and personal requirements and opportunities of a career in each professional health area.

Students will be acquainted with the status and trends of each area.

HLTH 140. PERSONAL AND COMMUNITY HEALTH. (3)
Meaning and significance of physical, mental and social health as related to the individual and to society; important phases of national health problems; constructive methods of promoting health of the individual and the community; health problems young people encounter with special emphasis on health knowledge for future teachers.

HLTH 150. FIRST AID. (1)
Lecture, demonstration, and skill training in first aid measures for resuscitation, hemorrhage control, shock, burns, poisons, and bone injuries. Red Cross and Medical Self-Help certification awarded.

HLTH 260. INSTRUCTOR'S COURSE IN FIRST AID. (2)
Prerequisite: HLTH 150 or equivalent. Advanced consideration of the first aid techniques; orientation to methods, techniques and teaching aids; practical classroom instruction required. Red Cross instructor's certification awarded.

HLTH 270. SAFETY EDUCATION. (3)
Safety in the home, school and community. Safety education programs in the public schools.

HLTH 280. THE DRIVER AND HIS CHARACTERISTICS. (3)
Prerequisite: HLTH 270. The aim of this course is to treat the driver behavior problem in its relation to many of the psychophysical factors and forces in the traffic environment that impinge upon the man behind the wheel.

HLTH 305. DRIVER EDUCATION AND TRAFFIC SAFETY I. (3)
Prerequisites: HLTH 270, 280. This course is a study of the place of the automobile in modern life and deals with the fundamentals, principles, practices, and content of high school driver education and traffic safety. Laboratory experience consists of observation and experience in teaching beginners to drive in dual control cars and simulators. Course includes eight weeks of practice teaching.

HLTH 310. INTRODUCTION TO THE SCHOOL HEALTH PROGRAM. (2)
Prerequisites: HLTH 105 or 140. This course deals with the aspects of school health: health environment, health services, and health education. The relationships of the school health program and the general education program are emphasized. The roles of teachers, administrators, health specialists, and others in related fields are discussed.

HLTH 340. CURRICULUM, INSTRUCTION AND OBSERVATION. (3)
Prerequisites: HLTH 140, 270, 310, 420. A course designed to provide directed observation and discussion, coordinating these experiences with those from previous methods courses in the development of curricula for health and physical education. The course is planned to prepare for student teaching which follows in the same semester. The observations will be made of health programs in junior and senior high schools. This course must be taken during the semester in which the student is doing student teaching.

HLTH 345. DRIVER EDUCATION AND TRAFFIC SAFETY II. (3)
Prerequisites: HLTH 270, 280, 305, or their equivalents. Comprehensive programming for driver education; teaching to meet driving emergencies and winter conditions; resources and agencies; the teacher and driver education; consumer education, insurance and liability.

HLTH 365. ORGANIZATION, ADMINISTRATION AND SUPERVISION OF SCHOOL SAFETY EDUCATION. (3)
Prerequisites: HLTH 270, 280, 305, 345 or their equivalents. Designed for teachers, school administrators, college instructors, and others responsible for directing or supervising safety programs in the schools. Deals with the problems, policies, practices, and procedures involved in the organization, administration and the supervision of a comprehensive accident prevention and safety education program for the schools. Considers integration factors of the school safety programs with the special emphasis on traffic programs.

HLTH 375. PROBLEMS IN DRIVER AND TRAFFIC SAFETY EDUCATION. (3)
Prerequisites: HLTH 270, 280, 305, 345 or their equivalents. An advanced course which gives consideration to the individual problems encountered in teaching driver and safety education. The psychology of teaching and learning are emphasized. Consideration is given to the implications of emotion and attitude factors in driver and traffic education. The course includes an examination of existing courses of study, research, supervisory and evaluation practices.

HLTH 390. ORGANIZATION AND ADMINISTRATION OF SCHOOL HEALTH PROGRAMS. (3)
The three major aspects of the school health program are considered. Problems connected with health services, health instruction, and the health aspects of the school environment are discussed. The responsibilities of school personnel are delineated with emphasis on the role of the administrator.

HLTH 420. METHODS AND MATERIALS IN HEALTH EDUCATION. (3)
Prerequisites: HLTH 105 or 140; HLTH 310 or consent of instructor. The purpose of this course is to present the interrelationships of curriculum planning, methodology and the selection and use of teaching aids and materials. Special problems associated with health teaching are discussed. Students will become familiar with a variety of resources as well as planning for and presenting demonstration lessons.

HLTH 450. HEALTH PROBLEMS OF CHILDREN AND YOUTH. (3)
This course involves a study of the health needs and problems of pupils from the primary grades through high school. Physical, mental and psychosomatic aspects of health are considered in relation to the developmental and school levels. Consideration is given to such topics as diet selection and control; exercise, recreation and rest; emotional upset and its implications; and psychosexual development and problems. The role of the teacher and parent in encouraging optimal health is emphasized.

HLTH 455. PHYSICAL FITNESS OF THE INDIVIDUAL. (3)
A study of the major physical fitness problems confronting the adult in modern society. Consideration is given to the scientific appraisal, development and maintenance of fitness at all age levels. Such problems as obesity, weight reduction, chronic fatigue, posture, and special exercise programs are explored. This course is open to persons outside the fields of Physical Education and Health.

HLTH 456. HEALTH PROBLEMS OF THE AGING AND AGED. (3)
Psychological, physiological, and socio-economic aspects of aging; nutrition; sexuality, death, dying, and bereavement; self actualization and creativity; health needs and crises of the aged.

HLTH 460. PROBLEMS IN SCHOOL HEALTH EDUCATION IN ELEMENTARY AND SECONDARY SCHOOLS. (2-6)
This is a workshop type course designed particularly for inservice teachers to acquaint them with the best methods of providing good health services, healthful environment and health instruction.

HLTH 470. THE HEALTH PROGRAM IN THE ELEMENTARY SCHOOL. (3)
Prerequisites: HLTH 105 or 140; 310. This course, designed for the elementary school classroom teacher, analyzes biological and sociological factors which determine the health status and needs of the individual ele-

mentary school child. The various aspects of the school program are evaluated in terms of their role in health education. The total school health program is surveyed from the standpoint of organization and administration, and health appraisal. Emphasis is placed upon modern methods and current materials in health instruction. (The State Department of Education accepts this course for biological science credit.)

HLTH 476. DEATH EDUCATION AND SUICIDE PREVENTION. (3)
The study and investigation of human dying, death, bereavement, suicidal behavior, and their relationship to human health utilizing a multidisciplinary approach. The course will consist of lectures and discussion, field trips to the suicidology centers and hospitals. A research project is required.

HLTH 477. FUNDAMENTALS OF SEX EDUCATION. (3)
This course is concerned with basic information regarding the physical, psychological, social, historical, semantic and comparative cultural aspects of sex. The adjustment needs and problems of children and adults during the course of maturing and aging are studied; and special consideration is given to the sex education program in schools.

HLTH 480. MEASUREMENT IN HEALTH. (3)
Two lectures and two laboratory periods per week. The application of the principles and techniques of educational measurement to the teaching of health and physical education; study of functions and techniques of measurements in the evaluation of student program toward the objectives of health and physical education, and in the evaluation of the effectiveness of teaching.

HLTH 488. CHILDREN'S PHYSICAL DEVELOPMENTAL CLINIC. (1-4)
Prerequisite: At least junior standing in health, physical education and recreation, or by special permission of the director. An opportunity to acquire training and experience in a therapeutically oriented physical education-recreation program for children referred by various education, special education, medical and psychiatric groups.

HLTH 489. FIELD LABORATORY PROJECTS AND WORKSHOP. (1-6)
A course designed to meet the needs of persons in the field with respect to workshop and research projects in special areas of knowledge not covered by regularly structured courses. Note: The maximum total number of credits that may be earned toward any degree in physical education, recreation, or health education under PHED, RECR, HLTH or EDUC 489 is six.

HONORS

HONR 100. HONORS ORIENTATION COLLOQUIUM. (3)
A multi-sectioned colloquium on current topics in the humanities, the natural sciences and the social sciences. The topics will vary with the interest of the instructors. Writing on, and in-class discussions of, assigned reading will be stressed. Ordinarily taken by all general honors freshmen. Open to other students with the consent of the Director of Honors.

HONR 339. SEMINAR IN THE SOCIAL SCIENCES. (1-4)
A series of seminars in the social sciences. Often interdisciplinary in character and often team-taught. The subjects of the seminars and the faculty may vary from semester to semester. Seminars may be repeated for credit, with the permission of the director of honors, if the content of the course alters appreciably. Open to general and departmental honors students and to other students with the consent of the instructor and the director of honors.

HONR 349. SEMINAR IN THE NATURAL SCIENCES. (1-4)
A series of seminars in the natural sciences. Often interdisciplinary in character and often team-taught. The subjects of the seminars and the faculty may vary from semester to semester. Seminars may be repeated for credit, with the permission of the director of honors, if the content of the course alters appreciably. Open to general and departmental honors students and to other students with the consent of the instructor and the director of honors.

HONR 359. SEMINAR IN THE HUMANITIES. (1-3)
A series of seminars in the humanities. Often interdisciplinary in character and often team-taught. The subjects of the seminars and the faculty may vary from semester to semester. Seminars may be repeated for credit, with the permission of the director of honors, if the content of the course alters appreciably. Open to general and departmental honors students and to other students with the consent of the instructor and the director of honors.

HONR 360. HONORS THESIS RESEARCH. (3)
A thesis preparation course for general honors students under the direction of individual faculty members. HONR 360 or 379, but not both, may be used once to fulfill the general honors seminar requirement. Graded pass-fail. May not be repeated. Open only to general honors students.

HONR 379. HONORS INDEPENDENT STUDY. (1-6)
Honors independent study involves reading or research, directed by individual faculty, especially in areas outside of the student's major. HONR 379 or HONR 360 but not both, may be used once to fulfill the general honors seminar requirement. Graded pass-fail. May be repeated to a maximum of 12 hours. Open only to general honors students.

HORTICULTURE

HORT 111. TREE FRUIT PRODUCTION. (3)
Prerequisite: BOTN 100. Two lectures and one laboratory per week. A detailed study of the principles and practices in fruit production, harvesting and storage, with emphasis on the apple. One Saturday field trip required.

HORT 112. TREE FRUIT PRODUCTION. (2)
Alternate years. Two lectures per week. Prerequisite: HORT 111. A study of the principles and practices in fruit production, harvesting, and handling of deciduous tree fruit crops other than the apple.

HORT 132. GARDEN MANAGEMENT. (2)
Two lectures per week. Prerequisite: BOTN 100. The planting and care of ornamental plants on the home grounds and a study of commonly used species of annuals and herbaceous perennials.

HORT 142. GARDEN MANAGEMENT LABORATORY. (1)
One two-hour laboratory per week. Prerequisite or corequisite: HORT 132. Demonstration and application of practices in the production and maintenance of garden plants.

HORT 160. INTRODUCTION TO THE ART OF LANDSCAPING. (3)
Three lectures per week. The theory and general principles of landscaping design with their application to public and private areas.

HORT 171. ELEMENTS OF FORESTRY. (3)
Two lectures per week. Prerequisite: BOTN 100. A general survey of the field of forestry, including timber values, conservation, protection, silviculture, utilization, mensuration, engineering, recreation and lumbering. Principles and practices of woodland management. Four all-day Saturday field trips are required.

HORT 212. BERRY PRODUCTION. (3)
Two lectures and one laboratory period a week. Prerequisite: BOTN 100. A study of the principles and practices involved in the production of small fruits including grapes, strawberries, raspberries, blackberries, and cranberries.

HORT 222. VEGETABLE PRODUCTION. (3)
Two lectures and one laboratory period a week. Prerequisite: BOTN 100. A study of the principles and practices of commercial vegetable production.

HORT 231. GREENHOUSE MANAGEMENT. (3)
Three lectures per week. Prerequisite: BOTN 100. A study of the construction and operation of structures for forcing horticultural crops and the principles underlying the regulation of plant growth under greenhouse conditions.

HORT 232. FLOWER STORE MANAGEMENT. (3)
Two lectures and one laboratory period a week. Prerequisite: HORT 231. A study of the operation and management of a flower store. Laboratory period devoted to principles and practice of floral arrangements and decoration.

HORT 241. GREENHOUSE CROP PRODUCTION LABORATORY. (1)
One laboratory per week. Prerequisite or corequisite: HORT 231. Demonstration and application of practices in the commercial production of greenhouse crops.

HORT 242. GREENHOUSE CROP PRODUCTION LABORATORY. (1)
One laboratory per week. Prerequisite: HORT 231. Demonstration and application of practices in the commercial production of greenhouse crops.

HORT 260. BASIC LANDSCAPE COMPOSITION. (2)
Two laboratory periods per week. The introduction of landscaping presentation technique, supplemented by problems in basic composition.

HORT 271. PLANT PROPAGATION. (3)
Three lectures per week. Prerequisite: BOTN 100. A study of the principles and practices of the propagation of plants.

HORT 274. GENETICS OF CULTIVATED PLANTS. (3)
Three lectures per week. Prerequisite: BOTN 100. Principles of plant genetics in relation to plant breeding. Some of the topics presented are meiosis, simple Mendelian genetics, gene interaction, linkage and crossing over, cytoplasmic and quantitative inheritance, mutations, and the role of DNA.

HORT 361. PRINCIPLES OF LANDSCAPE DESIGN. (3)
One lecture and two laboratory periods per week. Prerequisite: HORT 160 and HORT 260. A consideration of design criteria and procedure as applied to residential properties.

HORT 362. ADVANCED LANDSCAPE DESIGN. (3)
One lecture and two laboratory periods per week. Prerequisite: HORT 361, prerequisite or corequisite: HORT 454. The design of public and private areas with the major emphasis on plant materials.

HORT 364. LANDSCAPE CONSTRUCTION. (3)
One lecture and two laboratory periods per week. Prerequisite: HORT 361. An introductory study and application of location methods, construction details, and construction techniques of the various landscape objects such as walks, walls, benches, roads.

HORT 398. SEMINAR. (1)
Oral presentation of the results of investigational work by reviewing recent scientific literature in the various phases of horticulture.

HORT 399. SPECIAL PROBLEMS. (2)
Credit arranged according to work done. For major students in horticulture or botany. Four credits maximum per student.

HORT 411. TECHNOLOGY OF FRUITS. (3)
Three lectures per week. Prerequisite: HORT 112, or concurrent BOTN 441. A critical analysis of research work and application of the principles of plant physiology, chemistry, and botany to practical problems in commercial production.

HORT 417. TREE AND SMALL FRUIT MANAGEMENT. (1)
Primarily designed for vocational agriculture teachers and extension agents. Special emphasis will be placed upon new and improved commercial methods of production of the leading tree and small fruit crops. Current problems and their solution will receive special attention.

HORT 422. TECHNOLOGY OF VEGETABLES. (3)
Three lectures per week. Prerequisite: HORT 222, prerequisite or concurrent BOTN 441. A critical analysis of research work and application of the principles of plant physiology, chemistry, and botany to practical problems of commercial vegetable production.

HORT 427. TRUCK CROP MANAGEMENT. (1)
Primarily designed for teachers of vocational agriculture and extension agents. Special emphasis will be placed upon new and improved methods of production of the leading truck crops. Current problems and their solutions will receive special attention.

HORT 432. FUNDAMENTALS OF GREENHOUSE CROP PRODUCTION. (3)
Three lectures per week. Prerequisite: HORT 231. This course deals with a study of the commercial production and marketing of ornamental plant crops under greenhouse, plastic houses and out-of-door conditions.

HORT 451. TECHNOLOGY OF ORNAMENTALS. (3)
Three lectures per week. Prerequisite or corequisite: BOTN 441. A study of the physiological processes of the plant as related to the growth, flowering and storage of ornamental plants.

HORT 453. WOODY PLANT MATERIALS. (3)
Prerequisite: BOTN 212. A field and laboratory study of trees, shrubs, and vines used in nornamental plantings.

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HORT 456. PRODUCTION AND MAINTENANCE OF WOODY PLANTS. (3)
Two lectures and one laboratory period a week. Prerequisite or corequisite: HORT 271, 454. A study of the production methods and operation of a commercial nursery and the planting and care of woody plants in the landscape.

HORT 457. ORNAMENTAL HORTICULTURE. (1)
A course designed for teachers of agriculture and extension agents to place special emphasis on problems of the culture and use of ornamental plants.

HORT 471. SYSTEMATIC HORTICULTURE. (3)
Two lectures and one laboratory period a week. A study of the origin, taxonomic relationship and horticultural classification of fruits and vegetables.

HORT 474. PHYSIOLOGY OF MATURATION AND STORAGE OF HORTICULTURAL CROPS. (2)
Two lectures a week. Prerequisite: BOTN 441. Factors related to maturation and application of scientific principles to handling and storage of horticultural crops.

HORT 489. SPECIAL TOPICS IN HORTICULTURE. (1-3)
Credit according to time scheduled and organization of course. A lecture and/or laboratory series organized to study in depth a selected phase of horticulture not covered by existing courses.

HOUSING AND APPLIED DESIGN

HSAD 240. DESIGN AND FURNISHINGS IN THE HOME. (3)
Three lectures a week. Prerequisites: APDS 101 or 104. Designed to meet need for basic information and competency in choice and arrangement of home furnishings. For nonmajors only.

HSAD 241. FAMILY HOUSING. (3)
Housing and its relationship to family living. A study of factors which shape housing design; investigation of group and individual housing needs and values.

HSAD 246. MATERIALS OF INTERIOR DESIGN. (3)
Prerequisite: Consent of instructor. Investigation of materials and construction characteristics of interior architecture and furnishings. Emphasis on use, limitations, sources. Directions in current research.

HSAD 340. PERIOD HOMES AND THEIR FURNISHINGS. (3)
Prerequisites: APDS 101, HSAD 246, or equivalent. A study of authentic interiors and furnishings. Exploration of style influences apparent in contemporarily produced items.

HSAD 341. CONTEMPORARY DEVELOPMENTS IN ARCHITECTURE, INTERIORS, FURNISHINGS. (3)
Prerequisite: HSAD 246 and consent of instructor. Style origins and development of twentieth century architecture as living space. Architects, designers, trends, philosophy of relationship of interior space to furnishings.

HSAD 342. SPACE DEVELOPMENT. (3)
One lecture, 2 two-hour studios. Prerequisites: APDS 101, 102, 103; EDIN 101A, or equivalent. A study of blue prints and house construction as they relate to the interior designer. Development and drafting of original plans emphasizing the functional spatial relationship of furnishings to interiors.

HSAD 343. INTERIOR DESIGN I. (3)
One lecture-discussion, two studio periods. Prerequisites: APDS 101, EDIN 210, or equivalent. Complete presentation of rooms; isometric and perspective projections rendered in color; purchase and work orders. Emphasis on individual and family living space.

HSAD 344. INTERIOR DESIGN II. (3)
One lecture-discussion, two studio periods. Prerequisite: HSAD 343. Continuation of HSAD 343 with emphasis on commercial and contract assignments.

HSAD 345. PROFESSIONAL ASPECTS OF INTERIOR DESIGN. (3)
One lecture plus work experience. Professional orientation, ethics, and practices.

HSAD 380. PROFESSIONAL SEMINAR. (2)
Two lecture-discussion periods. Prerequisite: Junior standing and consent of instructor. Exploration of professional and career opportunities, ethics, practices, professional organizations. Portfolio evaluation.

HSAD 440. INTERIOR DESIGN III. (4)
Eight hours studio. Prerequisite: HSAD 344. Preparation of complete presentation: work specifications, floor plans, purchase orders, renderings, etc. Portfolio preparation.

HSAD 441. INTERIOR DESIGN IV. (4)
Eight hours studio periods. Prerequisite: HSAD 440. Preparation of complete presentation: work specifications, floor plans, purchase orders, renderings, etc. Portfolio preparation.

HSAD 442. READINGS IN HOUSING. (3)
Seminar. Prerequisites: SOCY 100, HSAD 241, senior standing. To satisfy individual interests and needs. Opportunity afforded for concentrated reading on one or more facets of housing (urban renewal, public housing, etc) Examination of completed research, needed future research.

HSAD 488. SELECTED TOPICS IN HOUSING AND INTERIOR DESIGN. (1-6)
Offered on demand. May be repeated to a maximum of six hours.

HSAD 499. INDIVIDUAL STUDY IN HOUSING AND/OR INTERIOR DESIGN. (3-4)
Guidance for the advanced student capable of independent subject matter investigation or creative work. Problem chosen with consent of instructor.

INSTITUTION ADMINISTRATION

IADM 300. FOOD SERVICE ORGANIZATION AND MANAGEMENT. (3)
Introduction to the food services, principles of organization, management, financial control, and technical operations. Records, reports and organization charts included.

IADM 350. PRACTICUM IN INSTITUTION ADMINISTRATION. (3)
Prerequisites: Five credits in IADM and consent of department. In-service training and practical experience, totaling at least 240 hours, in an approved food service.

IADM 410. SCHOOL FOOD SERVICE. (3)
Two lectures and one morning a week for field experience in a school food service. Prerequisites: FOOD 200, or 240, 250, and NUTR 300, or consent of instructor. Study of organization and management, menu planning, food purchasing, preparation, service, and cost control in a school lunch program.

IADM 420. QUANTITY FOOD PURCHASING. (3)
Prerequisite: FOOD 240, introductory accounting recommended. Food selection and the development of integrated purchasing programs. Standards of quality; the marketing distribution system.

IADM 430. QUANTITY FOOD PRODUCTION. (3)
Two hours of lecture and one three-hour laboratory a week. Prerequisites: FOOD 240, or consent of instructor. Scientific principles and procedures employed in food preparation in large quantity. Laboratory experience in management techniques in quantity food production and service.

IADM 440. FOOD SERVICE PERSONNEL ADMINISTRATION. (2)
Prerequisite: IADM 300. Principles of personnel administration in food services; emphasis on personnel selection; supervision and training; job evaluation, wage and payroll structure, current labor regulations, and interpersonal relationships and communications.

IADM 450. FOOD SERVICE EQUIPMENT AND PLANNING. (2)
Two lectures a week. Prerequisite: Consent of instructor. Equipment design, selection, maintenance and efficient layout, relation of the physical facility to production and service.

IADM 460. ADMINISTRATIVE DIETETICS I. (3)
(Open only to students accepted into and participating in the U.S. Army Dietetic Internship Program at Walter Reed General Hospital or the Coordinated Undergraduate Dietetics Program). Application of management theory through guided experience in all aspects of hospital dietary department administration. For students in the coordinated undergraduate dietetics program 12 hours per week of hospital food service management experience is required and this course must be accompanied by IADM 300 and 430.

IADM 470. ADMINISTRATIVE DIETETICS II. (3)
(Open only to students accepted into and participating in the U.S. Army Dietetic Internship Program at Walter Reed General Hospital or the Coordinated Undergraduate Dietetics Program). Continuation of IADM 460. For students in the coordinated undergraduate dietetics program 12 hours per week hospital food service experience is required and this course must be accompanied by IADM 420 and 440.

IADM 490. SPECIAL PROBLEMS IN FOOD SERVICE. (2-3)
Prerequisites: Five credits in IADM and consent of depart- Prerequisites: Senior standing, five hours in IADM courses and consent of instructor. Individual selected problems in the area of food service.

INFORMATION SYSTEMS MANAGEMENT

IFSM 401. ELECTRONIC DATA PROCESSING. (3)
Prerequisites: Junior standing, MATH 111 or the equivalent. The electronic digital computer and its use as a tool in processing data. The course includes the following areas: (1) Organization of data processing systems, (2) environmental aspects of computer systems, (3) management control problems and potentials inherent in mechanized data processing systems.

IFSM 402. ELECTRONIC DATA PROCESSING APPLICATIONS. (3)
Prerequisites: IFSM 401 and BSAD 231, or consent of instructor. Intensive study of computer applications using a problem-oriented language. Introduction of computer methods for the solution of organizational problems. Laboratory exercises in programming and development of computer techniques.

IFSM 410. INFORMATION PROCESSING PROBLEMS OF MODELS OF ADMINISTRATIVE, ECONOMIC AND POLITICAL SYSTEMS. (3)
Prerequisites: MATH 141 or equivalent; IFSM 402, BSAD 231, and some familiarity with administrative, economic and or political models. Prerequisites may be waived with the consent of instructor. Data processing requirements underlying the creation and maintenance of a data base to be used in estimating the parameters of socio-economic models. An analysis of the structure and development of recent socio-economic models as relevant to data processing considerations. Extractions and preparation of data from the data base to facilitate the appropriate transformation necessary for model construction and also to minimize the processing cost of data input. The course draws upon a knowledge of models of administrative, economic and political systems. Case studies and experience with data processing for selected models are included.

IFSM 420. INFORMATION PROCESSING AND COMPUTATIONAL PROBLEMS IN OPERATIONS ANALYSIS. (3)
Prerequisites: MATH 141 or equivalent; IFSM 402, and a course in Statistics, such as BSAD 430, dealing with multivariate models. Prerequisites may be waived with the consent of the instructor. Implementation of applications requiring the integration of data processing and analytical programming techniques. Such applications feature the calculation of various statistical estimates of the parameters in a multivariate model within the context of a file maintenance problem (e.g., the writing of a matrix inversion routine for revenue forecasting within a master updating program or sales forecasting and/or sales performance evaluation within a sales transaction—master updating program). A universal, problem-oriented language such as COBOL will be used with strong emphasis on the use of the mathematical Fortran IV library subroutines. Class projects include case studies and solutions of problems using real-world data.

IFSM 436. INTRODUCTION TO SYSTEMS ANALYSIS. (3)
Prerequisites: IFSM 102, BSAD 430, MATH 141, or the equivalent. Prerequisites may be waived with consent of instructor. The use of the computer in the management and operation of organizations. The course includes the following areas: (1) the principles of systems analysis, (2) recent applications and innovations of the systems concept, (3) design and implementation of computer systems, including such techniques as mathematical programming, simulation, business games and network analysis, and (4) laboratory use of a digital computer in the application of these techniques.

ITALIAN

ITAL 101. ELEMENTARY ITALIAN. (4)
Introduction to basic grammar and vocabulary; written and oral work. Four recitations per week, plus one voluntary, recommended drill period, during which oral skills are emphasized.

ITAL 102. ELEMENTARY ITALIAN (4)
Completion of study of basic grammar; written and oral work, with an increasing emphasis on spoken Italian. Four recitations per week, plus one voluntary, recommended drill period stressing conversational skills.

H—HONORS
Limited to students recommended by their 101 instructor. An accelerated course of study with completion of basic structures. Emphasis on reading as well as oral and written expression. Five recitations per week plus one voluntary, recommended live drill. Prepares the student for higher level courses in Italian. Fulfills the language requirement.

ITAL 104. INTERMEDIATE ITALIAN. (4)
Review of Italian grammar; extensive reading, discussion, and composition. Four recitations per week, plus one voluntary, recommended drill period stressing conversational skills. Fulfills the language requirement.

ITAL 111. ELEMENTARY ITALIAN. (3)
Three recitations and one laboratory hour per week. Elements of grammar and exercises in translation.

ITAL 112. ELEMENTARY ITALIAN. (3)
Three recitations and one laboratory hour per week. Elements of grammar and exercises in translation.

ITAL 114. INTERMEDIATE ITALIAN. (3)
Three recitations per week. Prerequisite: ITAL 112 or equivalent. Reading of texts designed to give some knowledge of Italian life, thought and culture.

ITAL 115. INTERMEDIATE ITALIAN. (3)
Three recitations per week. Prerequisite: ITAL 112 or equivalent. Reading of texts designed to give some knowledge of Italian life, thought and culture.

ITAL 121. ACCELERATED ITALIAN. (3)
Open only to students who have fulfilled language requirements in French, Spanish or Portuguese, or with permission of department chairman. An intensive beginning course in the fundamentals of Italian grammar to develop a high degree of skill in reading Italian. Must be taken in sequence. Cannot be used to satisfy language requirements.

ITAL 122. ACCELERATED ITALIAN. (3)
Open only to students who fulfilled language requirements in French, Spanish or Portuguese, or with permission of department chairman. An intensive beginning course in the fundamentals of Italian grammar to develop a high degree of skill in reading Italian. Must be taken in sequence. Cannot be used to satisfy language requirements.

ITAL 201. CONVERSATION AND COMPOSITION. (3)
Prerequisite: ITAL 104 or 115. A practical language course recommended for all students continuing in Italian. May be taken concurrently with ITAL 251.

ITAL 251. INTRODUCTION TO ITALIAN LITERATURE. (3)
Prerequisite: ITAL 104 or 115. Required of all students who continue in advanced courses of the department with the exception of superior students who are permitted to bypass an introduction to Italian literature. Conducted in Italian. Reading of literary texts, discussion and brief essays.

ITAL 301. ADVANCED CONVERSATION AND COMPOSITION. (3)
Prerequisite: ITAL 201 or consent of instructor. Written and oral work, grammar review and practice, designed to better the students abilities to write and speak fluently and correctly.

ITAL 351. SURVEY OF ITALIAN LITERATURE. (3)
Prerequisite: ITAL 115 or equivalent. Basic survey of history of Italian literature.

ITAL 352. SURVEY OF ITALIAN LITERATURE. (3)
Prerequisite: ITAL 115 or equivalent. Basic survey of history of Italian literature.

ITAL 410. THE ITALIAN RENAISSANCE. (3)
A study of major trends of thought in Renaissance literature, philosophy, art, and science.

ITAL 498. SPECIAL TOPICS IN ITALIAN LITERATURE. (3)
Repeatable for a maximum of six credits.

ITAL 499. SPECIAL TOPICS IN ITALIAN STUDIES. (3)
An aspect of Italian studies, the specific topic to be announced each time the course is offered. Repeatable for a maximum of six credits.

JAPANESE

JAPN 101. ELEMENTARY JAPANESE. (4)
Three meetings of class and two laboratory or drill sessions per week. Introduction to Japanese grammar and written and spoken language, including ideographs and phonetic symbols.

JAPN 102. ELEMENTARY JAPANESE. (4)
Three meetings of class and two laboratory or drill sessions per week. Introduction to Japanese grammar and written and spoken language, including ideographs and phonetic symbols.

JAPN 104. INTERMEDIATE JAPANESE. (4)
Three meetings of class and one laboratory or drill session per week. Continuation of Japanese grammar and the written and spoken language, including more advanced ideographs and idioms and introduction to readings from actual Japanese sources.

JOURNALISM

JOUR 200. INTRODUCTION TO MASS COMMUNICATION. (3)
Survey of the process and effects of mass communication; historical development and social, economic, legal, and professional aspects of the mass media. Open to all students.

JOUR 201. WRITING FOR MASS MEDIA. (3)
Introduction to news, feature and publicity writing for the printed and electronic media; development of news concepts; laboratory in news gathering tools and writing skills. Prerequisite: typing ability and JOUR 200 (which may be taken concurrently, with permission).

JOUR 310. NEWS EDITING. (3)
Principles of the editing process and practice in copy editing, headline writing, newspaper page layout, and editorial judgment. Prerequisites: JOUR 200 and 201.

JOUR 320. NEWS REPORTING. (3)
Principles and practices of news reporting, with special emphasis on news gathering for all the media; covering news beats and other news sources, including researching a news story for accuracy, comprehensiveness and interpretation. Prerequisites: JOUR 200 and 201.

JOUR 321. REPORTING OF PUBLIC AFFAIRS. (3)
Advanced training in writing news for publication in specialized areas, particularly city, county, and federal news. Students meet in seminar with news sources and leading news reporters and work in Washington, D. C., Annapolis, and Baltimore in covering news in depth for publication. Prerequisites: JOUR 320 and permission of the instructor.

JOUR 330. PUBLIC RELATIONS. (3)
Study of the principles and historical development of public relations. Attention is given to fact-finding, planning, communication, and evaluation aspects of public relations. Study of the use of public relations in business, government, associations, and organizations. Prerequisites: JOUR 200 and 201.

JOUR 331. PRINCIPLES OF PUBLICITY. (3)
Prerequisite: JOUR 330. Study of the strategy and techniques of purposive communication; analysis of the techniques and effects of the publicity campaign and use of other tools of public relations; laboratory in publicity and other public relations techniques.

JOUR 340. PRINCIPLES OF TYPOGRAPHY AND PRODUCTION. (3)
Study of layout, typography, design, and printing in the planning and production of the printed media. Prerequisites: JOUR 200 and 201.

JOUR 341. ADVERTISING COPY AND LAYOUT. (3)
Theory and practice in advertising copy and layout, with emphasis on newspaper advertising, for letterpress and photo-offset printing. Use of illustrations, type selection, copy-fitting, media selection. Prerequisites: JOUR 200 and 201.

JOUR 350. PHOTOJOURNALISM. (3)
Prerequisites: JOUR 200 and 201. Fundamentals of camera operation and darkroom procedures, including developing and printing black and white still photographs for communications media. Department furnishes equipment and student furnishes supplies.

JOUR 351. ADVANCED PHOTOJOURNALISM. (3)
Prerequisite: JOUR 350. Analysis of the role of photography in mass communication, with emphasis on the photographic essay, and use of the 35 mm camera. Students provide 35 mm equipment and supplies.

JOUR 360. BROADCAST NEWS WRITING. (3)
Study of and practice in the special application of news writing and editing to the broadcasting media, including the use of wire copy and tape recorders in producing newscasts. Prerequisites: JOUR 320 and 321.

JOUR 361. REPORTING THROUGH AUDIO-VISUAL MEDIA. (3)
Principles of live photography and recording in the production of news and documentaries for all the media. Prerequisites: JOUR 350 and 360.

JOUR 370. INDUSTRIAL JOURNALISM. (3)
Industrial communications, management and production of company periodicals, public relations aspects of industrial journalism. Prerequisites: JOUR 200 and 201.

JOUR 371. MAGAZINE ARTICLE AND FEATURE WRITING. (3)
Study of types of feature articles, particularly for the magazine market, analysis of the magazine medium and specialized audiences; practice in researching and writing the feature article; analysis of free-lance markets. Prerequisites: JOUR 200 and 201.

JOUR 380. JOURNALISM FOR SCIENCE AND TECHNOLOGY. (3)
Study and practice of the basic techniques of writing and editing scientific and technical material for both the general audience and the specialist. Prerequisites: JOUR 200 and 201.

JOUR 390. NEWS COMMENTARY AND CRITICAL WRITING. (3)
Prerequisite' JOUR 320. Study and practice of journalistic interpretation and analysis, editorial writing, and critical writing.

JOUR 400. LAW OF MASS COMMUNICATION. (3)
Study of the legal rights and constraints of mass media; libel, privacy, copyright, monopoly, and contempt, and other aspects of the law applied to mass communication. Previous study of the law not required. Prerequisites: JOUR 200 and 201.

JOUR 410. HISTORY OF MASS COMMUNICATION. (3)
Study of the development of newspapers, magazines, radio, television, and motion pictures as media of mass communication. Analysis of the influences of the media on the historical development of America. Prerequisites: JOUR 200 and 201.

JOUR 420. GOVERNMENT AND MASS COMMUNICATION. (3)
Study of the relationship between the news media and government. Analysis of media coverage of government and politics. Study of governmental and political information and persuasion techniques. Prerequisites: JOUR 200 and 201.

JOUR 430. COMPARATIVE MASS COMMUNICATION SYSTEMS. (3)
Survey of the history and status of the mass media throughout the world; comparative analysis of the role of the press in different societies. Prerequisites: JOUR 200 and 201 or consent of the instructor for non-majors.

JOUR 440. PUBLIC OPINION AND MASS COMMUNICATION. (3)
Prerequisites: JOUR 200 and 201. Study of publics and their interrelationships in the formation of public opinion; measurement of public opinion and media habits; role of the mass media in the formation of public opinion.

JOUR 490. SEMINAR IN JOURNALISM. (3)
Seminar for journalism seniors in newsroom problems and policies, emphasizing ethics and responsibilities; in cooperation with the Baltimore Sun, Baltimore News-American, and other area news media. Prerequisite: Permission of the instructor.

JOUR 497. SUPERVISED INTERNSHIP. (1)
Summer session. To be taken following junior year as major in this department, permission of Instructor. Ten weeks of organized, supervised study, experience, on-the-job training in journalism.

JOUR 499. PROBLEMS IN JOURNALISM. (1-3)
Individual projects in journalism, including internships. May be repeated to a maximum of three hours.

LATIN

LATN 101. ELEMENTARY LATIN. (3)
A student who has had two units of Latin in high school may register for LATN 101 for purposes of review, but not for credit.

LATN 102. ELEMENTARY LATIN. (3)
A student who has had two units of Latin in high school may register for LATN 102 for credit with departmental permission.

LATN 170. GREEK AND ROMAN MYTHOLOGY. (3)
Taught in English, no prerequisite. Cannot be taken for language credit. *This course is particularly recommended for students planning to major in foreign languages, English, history, the fine arts, or journalism.*

LATN 203. INTERMEDIATE LATIN (CAESAR). (3)
Prerequisite: LATN 101, 102 or equivalent.

LATN 204. INTERMEDIATE LATIN (CICERO). (3)
Prerequisite: LATN 203 or equivalent.

LATN 305. VERGIL'S AENEID. (3)
Prerequisite: LATN 204 or equivalent.

LATN 351. HORACE. (3)
Prerequisite: LATN 305 or equivalent.

LATN 352. LIVY. (3)
Prerequisite: LATN 351 or equivalent.

LATN 361. PLINY'S LETTERS. (3)
Prerequisite: LATN 352 or equivalent.
Prerequisite for 400-level courses, LATN 361.

LATN 401. CATULLUS AND THE ROMAN ELEGIAC POETS. (3)

LATN 402. TACITUS. (3)

LATN 403. ROMAN SATIRE. (3)

LATN 404. ROMAN COMEDY. (3)

LATN 405. LUCRETIUS. (3)

LATN 411. ADVANCED LATIN GRAMMAR. (3)
Prerequisite: Three years of college Latin or equivalent. An intensive study of the morphology and syntax of the Latin language supplemented by rapid reading.

LATN 499. LATIN READINGS. (3)
Prerequisite: Consent of instructor. The reading of one or more selected Latin authors from antiquity through the Renaissance. Reports. May be repeated with different content.

CRIMINAL JUSTICE AND CRIMINOLOGY

LENF 100. INTRODUCTION TO LAW ENFORCEMENT. (3)
Introduction to the administration of criminal justice in a democratic society with emphasis upon the theoretical and historical development of law enforcement. The principles of organization and administration for law enforcement; functions and specific activities; planning and research; public relations, personnel and training; inspection and control; direction; policy formulation.

LENF 220. INVESTIGATION IN LAW ENFORCEMENT. (3)
Investigation as a process of communication. Principles and problems in information collection and evaluation; impartial gathering and evaluation of data. Crime scene search and recording; collection and preservation of physical evidence; scientific aids; *modus operandi;* sources of information; interviewing; follow-up and case preparation.

LENF 230. CRIMINAL LAW IN ACTION. (3)
Law as one of the methods of social control. Criminal law: its nature, sources, and types; theories and historical developments. Behavioral and legal aspects of criminal acts. Classification and analysis of selected criminal offenses.

LENF 234. CRIMINAL PROCEDURE AND EVIDENCE. (3)
Prerequisite: LENF 230. General principles and theories of criminal procedure. Due process. Arrest, search and seizure. Recent developments. Study and evaluation of evidence and proof.

LENF 330. CONTEMPORARY LEGAL POLICY ISSUES. (3)
Prerequisite: LENF 230 and 234 or equivalent. In-depth examination of selected topics. Criminal responsibility. Socio-legal policy alternatives with regard to deviance. Law enforcement procedures for civil law and similar legal problems. Admissibility of evidence. Representation. Indigent's right to counsel.

LENF 340. CONCEPTS OF LAW ENFORCEMENT ADMINISTRATION. (3)
Prerequisite: LENF 100 or equivalent. An introduction to concepts of organization and management as these relate to law enforcement. Principles of structure, process, policy and procedure, communication and authority, division of work and organizational controls. Human element in the organization. Informal interaction and bureaucracy.

LENF 350. LAW ENFORCEMENT-COMMUNITY RELATIONS. (3)
Prerequisite: LENF 100 or equivalent. Examination of factors contributing to cooperation or friction between law enforcement personnel and the community, with emphasis on minority groups, political pressures and cultural problems. Community organization and social responsibility of law enforcement.

LENF 398. LAW ENFORCEMENT FIELD TRAINING. (1-6)
Prerequisite: Junior standing; majors only and consent of instructor. Supervised field training in law enforcement agencies as a structured and focused experience. The student, in consultation with his advisor, will select his particular area of interest and will be responsible to his advisor for continued contact and required reports.

LENF 399. DIRECTED INDEPENDENT RESEARCH. (1-3)
Prerequisite: Senior standing; majors only and consent of instructor. Supervised individual research and study; library and field research, surveys, special local problems.

LENF 444. ADVANCED LAW ENFORCEMENT ADMINISTRATION. (3)
Prerequisite: LENF 340 or consent of instructor. The structuring of manpower, material, and systems to accomplish the major goals of social control. Personnel and systems management. Political controls and limitations on authority and jurisdiction.

LENF 460. INDUSTRIAL AND RETAIL SECURITY ADMINISTRATION. (3)
Prerequisite: LENF 100, 220 and 340 or consent of instructor. The origins of contemporary private security systems. Organization and management of industrial and retail protective units.

LINGUISTICS

LING 100. INTRODUCTION TO LINGUISTICS. (3)
Introduction to the basic concepts of modern descriptive linguistics. Phonology, morphology, syntax. Examinations of the methods of comparative linguistics, internal reconstruction, dialect geography. (Listed also as ANTH 371 and as ENGL 280).

LING 101. LANGUAGE AND CULTURE. (3)

LING 101 (071). LANGUAGE AND CULTURE. (3)
Prerequisite: Sophomore standing. A nontechnical introduction to linguistics, with special consideration of the relations between language and other aspects of culture. (Listed also as ANTH 271).

LING 401. PHONETICS AND PHONEMICS. (3)
Training in the identification, description and symbolization of various sounds found in language. Study of scientific techniques for classifying sounds into units which are perceptually relevant for a given language.

LING 402. MORPHOLOGY AND SYNTAX. (3)
A detailed study of language structure. No student may receive credit for both LING 402 and ENGL 484.

LING 403. HISTORICAL LINGUISTICS. (3)
Prerequisite: LING 401 and 402, or equivalent. A study of change in the phonological, grammatical and semantic structures of natural languages; language typology; reconstruction and various allied topics will be treated.

MATHEMATICS

MATH 001. REVIEW OF HIGH SCHOOL ALGEBRA. (3)
Recommended for students who fail the qualifying examination for MATH 105, MATH 110, MATH 115. Special fee.

MATH 105. FUNDAMENTALS OF MATHEMATICS. (4)
Prerequisite: Satisfactory performance on the SAT mathematics test, or MATH 001. This course is designed to provide an introduction to mathematical thinking, stressing ideas rather than techniques. Where possible, connections are drawn with other disciplines.

MATH 110. INTRODUCTION TO MATHEMATICS I. (3)
Prerequisite: Two and one-half years of college preparatory mathematics and satisfactory performance on the SAT mathematics test, or MATH 001. Linear programming, systems of linear equations, matrices; elementary algebraic and transcendental functions, with emphasis on their properties and graphs. (Not open to students majoring in mathematics, engineering or the physical sciences. Credit will be given for only one course, MATH 110 or MATH 115.)

MATH 111. INTRODUCTION TO MATHEMATICS II. (3)
Prerequisite: Three and one-half years of college preparatory mathematics and satisfactory performance on the SAT mathematics test, or MATH 110, or MATH 115. Logic, Boolean algebra, counting, probability, random variables expectation applications of the normal probability distribution. (Not open to students majoring in mathematics, engineering or the physical sciences.)

MATH 115. INTRODUCTORY ANALYSIS. (3)
Two lectures, two drill periods per week. Prerequisite: Two and one half years of college preparatory mathematics and an appropriate score on the SAT mathematics test, or MATH 001. An introductory course for students not qualified to start MATH 140 or 220. Elementary functions and graphs: Polynomials, rational function, exponential and logarithmic functions, trigonometric functions. Credit will be given for only one course: MATH 115 or MATH 110.

MATH 140. ANALYSIS I. (4)
Three lectures, two drill periods per week. Prerequisite: Three and one half years of college preparatory mathematics or MATH 115. Sets and inequalities, cartesian coordinates in the plane, the straight line, the circle, translation of coordinate axes, functions and their graphs, limits, continuity, the derivative and application of the derivative, antiderivatives, definite integral. Credit will be given for only one course: MATH 140 or MATH 220.

MATH 141. ANALYSIS II. (4)
Three lectures, two drill periods per week. Prerequisite: MATH 140 or equivalent. Applications of integration, techniques of integration, polar coordinates, basic properties of the elementary functions, improper integrals, indeterminate forms, sequences, and infinite series. Credit will be given for only one course: MATH 141 or MATH 221.

MATH 150. CALCULUS I (HONORS). (4)
Prerequisite: Approval of department. A rigorous treatment, with applications, of differential and integral calculus in one variable.

MATH 151. CALCULUS II (HONORS). (4)
Prerequisite: Approval of department. A rigorous treatment, with applications, of differential and integral calculus in one variable.

MATH 210. ELEMENTS OF MATHEMATICS. (4)
Prerequisite: One year of college preparatory algebra. Required for majors in elementary education, and open only to students in this field. Topics from algebra and number theory, designed to provide insight into arithmetic: inductive proof, the natural number system based on the Peano axioms; mathematical systems, groups, fields; the system of integers; the system of rational numbers; congruence, divisibility; systems of numeration.

MATH 211. ELEMENTS OF GEOMETRY. (4)
Prerequisite: MATH 210 or equivalent. Structure of mathematics systems, algebra of sets, geometrical structures, logic, measurement, congruence, similarity, graphs in the plane, geometry on the sphere.

MATH 220. ELEMENTARY CALCULUS I. (3)
Prerequisite: Three and one-half years of college preparatory mathematics including trig, and satisfactory performance on the SAT mathematics test, or MATH 110, or MATH 115. Basic ideas of differential and integral calculus, with emphasis on elementary techniques of differentiation and applications. (Not open to students majoring in mathematics, engineering or the physical sciences. Credit will be given for only one course, MATH 220 or MATH 140.)

MATH 221. ELEMENTARY CALCULUS II. (3)
Prerequisite: MATH 220, or MATH 140, or equivalent. Differential and integral calculus, with emphasis on elementary techniques of integration and applications. (Not open to students majoring in mathematics, engineering or the physical sciences. Credit will be given for only one course, MATH 221 or MATH 141.)

MATH 240. LINEAR ALGEBRA. (4)
3 lectures, 2 drill periods per week. Prerequisite: MATH 141 or equivalent. Basic concepts of linear algebra: vector spaces, applications to line and plane geometry, linear equations and matrices, similar matrices, linear transformations, eigenvalues, determinants, and quadratic forms. Credit will be given for only one course: MATH 240 or MATH 400.

MATH 241. ANALYSIS III. (4)
3 lectures, 2 drill periods per week. Prerequisite: MATH 240 or equivalent. Calculus of functions of vectors: partial derivatives, multiple integration, surface integrals, classical theorems of Green, Gauss, and Stokes.

MATH 246. DIFFERENTIAL EQUATIONS FOR SCIENTISTS & ENGINEERS. (3)
Prerequisite: MATH 141 or equivalent. An introduction

to the basic methods of solving differential equations. Separable, exact, and especially linear differential equations will be treated. The main techniques included will be undetermined coefficients, series solutions, Laplace transforms, and numerical methods.

MATH 250. CALCULUS III (HONORS). (4)
Prerequisite: Approval of department. Elements of linear algebra, Euclidean and other metric spaces; Multi-variable calculus; implicit function theorem; theorems of Green, Gauss and Stokes. Riemann Stieltjes integral and, as time permits, ordinary differential equations, Fourier series, orthogonal functions.

MATH 251. CALCULUS IV (HONORS). (4)
Prerequisite: Approval of department. Elements of linear algebra, Euclidean and other metric spaces; Multi-variable calculus; implicit function theorem; theorems of Green, Gauss and Stokes. Riemann Stieltjies integral and, as time permits, ordinary differential equations, Fourier series, orthogonal functions.

MATH 398. HONORS SEMINAR. (2)
Prerequisite: Permission of the Departmental Honors Committee. Reports by students on mathematical literature; solution of various problems.

MATH 400. VECTORS AND MATRICES. (3)
Prerequisite: MATH 141 or MATH 221. Algebra of vector spaces and matrices. Recommended for students interested in the applications of mathematics. (Not open to students who have had MATH 240 or 405).

MATH 401. APPLIED LINEAR ALGEBRA. (3)
Prerequisite: MATH 400, or MATH 240, or consent of the instructor. Various applications of linear algebra: theory of finite games, linear programming, matrix methods as applied to finite Markov chains, random walk, incidence matrices, graphs and directed graphs, networks, transportation problems.

MATH 402. ALGEBRAIC STRUCTURES. (3)
Prerequisitee: MATH 240 or equivalent. The course is designed for students having only limited experience with rigorous mathematical proofs, and parallels MATH 403. Students planning graduate work in mathematics should take MATH 403. Groups, rings, integral domains and fields; detailed study of several groups; properties of integers and polynomials. Emphasis is on the origin of the mathematical ideas studied and the logical structure of the subject. (Not open to mathematics graduate students.)

MATH 403. INTRODUCTION TO ABSTRACT ALGEBRA. (3)
Prerequisite: MATH 241 or equivalent. Integers; groups, rings, integral domains, fields.

MATH 405. INTRODUCTION TO LINEAR ALGEBRA. (3)
Prerequisite: MATH 403 or consent of Instructor. An abstract treatment of finite dimensional vector spaces. Linear transformations and their invariants.

MATH 406. INTRODUCTION TO NUMBER THEORY. (3)
Prerequisite: One year of college mathematics. Rational integers, divisibility, prime numbers, modules and linear forms, unique factorization theorem, Euler's function, Mobius' function, cyclotomic polynomial, congruences and quadratic residues, Legendre's and Jacobi's symbol reciprocity law of quadratic residues, introductory explanation of the method of algebraic number theory.

MATH 410. ADVANCED CALCULUS. (3)
Prerequisite: MATH 241. First semester of a year course. Subjects covered during the year are: sequences and series of numbers, continuity and differentiability of real valued functions of one variable, the Riemann integral, sequences of functions, and power series. Functions of several variables including partial derivatives, multiple integrals, line and surface integrals. The implicit function theorem.

MATH 411. ADVANCED CALCULUS. (3)
Prerequisite: MATH 410, and MATH 240 or MATH 400. Continuation of MATH 410.

MATH 413. INTRODUCTION TO COMPLEX VARIABLES. (3)
Prerequisite: MATH 410. The algebra of complex numbers, analytic functions, mapping properties of the elementary functions. Cauchy's theorem and the Cauchy integral formula. Residues. (Credit will be given for only one of the courses, MATH 413 and 463).

MATH 414. DIFFERENTIAL EQUATIONS. (3)
Prerequisite: MATH 410 and MATH 240 or equivalent. Existence and uniqueness theorems for initial value problems. Linear theory: fundamental matrix solutions, variation of constants formula, Floquet theory for periodic linear systems. Asymptotic orbital and Lyapunov stability with phase plane diagrams. Boundary value theory and series solutions are optional topics.

MATH 415. INTRODUCTION TO PARTIAL DIFFERENTIAL EQUATIONS. (3)
Prerequisites: MATH 410 or MATH 462. Topics will include one dimensional wave equation; linear second order equations in two variables, separations of variables and Fourier series; Sturm-Liouville theory.

MATH 416. INTRODUCTION TO REAL VARIABLES. (3)
Prerequisite: MATH 410. The Lebesgue integral. Fubini's theorem. Convergence theorems. The Lp spaces.

MATH 417. INTRODUCTION TO FOURIER ANALYSIS. (3)
Prerequisite: MATH 410. Fourier series. Fourier and Laplace transforms.

MATH 430. GEOMETRIC TRANSFORMATIONS. (3)
Prequisite: MATH 240. Recommended for students in mathematics education. Important groups of geometric transformations, including the isometries and similarities of the plane. Geometries related to transformation groups.

MATH 431. FOUNDATIONS OF GEOMETRY. (3)
Prerequisite: One year of college mathematics. Recommended for students in mathematics education. The axiomatic foundations of geometry. Attention will be given to one or more axiomatic developments of Euclidean geometry and to the relation of Euclidean geometry to other geometric systems.

MATH 432. INTRODUCTION TO POINT SET TOPOLOGY. (3)
Prerequisite: MATH 410 or 450, or equivalent. Connectedness, compactness, transformations, homomorphisms application of these concepts to various spaces, with particular attention to the Euclidean plane.

MATH 433. INTRODUCTION TO ALGEBRAIC TOPOLOGY. (3)
Prerequisite: MATH 403 and 432, or equivalent. Chains, cycles, homology groups for surfaces, the fundamental group.

MATH 436. INTRODUCTION TO DIFFERENTIAL GEOMETRY. (3)
Prerequisite: MATH 241 or equivalent. The differential geometry of curves and surfaces, curvature and torsion, moving frames, the fundamental differential forms, intrinsic geometry of a surface.

MATH 444. ELEMENTARY LOGIC AND ALGORITHMS. (3)
Prerequisite, MATH 240 or consent of instructor. An elementary development of propositional logic, predicate logic set algebra, and Boolean algebra, with a discussion of Markov algorithms, turing machines and recursive functions. Topics include post productions, word problems, and formal languages. (Also listed as CMSC 450).

MATH 446. AXIOMATIC SET THEORY. (3)
Prerequisite: MATH 403 or 450 or consent of instructor. Development of a system of axiomatic set theory, choice principles, induction principles, ordinal arithmetic including discussion of cancellation laws, divisibility, canonical expansions, cardinal arithmetic including connections with the axiom of choice, Hartog's theorem, Konig's theorem, properties of regular, singular, and inaccessible cardinals.

MATH 447. INTRODUCTION TO MATHEMATICAL LOGIC. (3)
Prerequisite: MATH 403 or 450 or 410. Formal propositional logic, completeness, independence, decidability of the system, formal quantificational logic, first order axiomatic theories, extended Godel Completeness theorem, Lowenheim-Skolem theorem, model-theoretical applications.

MATH 450. FUNDAMENTAL CONCEPTS OF MATHEMATICS. (3)
Prerequisite: MATH 240 or consent of instructor. Sets, relations, mappings. Construction of the real number system starting with Peano postulates; algebraic structures associated with the construction; Archimedean order, sequential completeness and equivalent properties of ordered fields. Finite and infinite sets, denumberable and non-denumberable sets.

MATH 460. COMPUTATIONAL METHODS. (3)
Prerequisite: MATH 241 or 462, and CMSC 110 or equivalent. Study of the basic computational methods for interpolation, least squares, approximation, numercial quadrature, numerical solution of polynomial and transcendental equations, systems of linear equations and initial value problems for ordinary differential equations. The emphasis is placed on a discussion of the methods and their computational properties rather than on their analytic aspects. Intended primarily for students in the physical and engineering sciences. This course should not be taken by students who have passed MATH/CMSC 470. (Listed also as CMSC 460.)

MATH 462. ANALYSIS FOR SCIENTISTS AND ENGINEERS I. (3)
Prerequisite: MATH 240 or consent of instructor. Credit will be given for only one of the courses, MATH 241 or MATH 462. Calculus of functions of several real variables; limits, continuity, partial differentiation, multiple integrals, line and surface integrals, vector-valued functions, theorems of Green, Gauss and Stokes. Physical applications. (This course cannot be counted toward a major in mathematics.)

MATH 463. COMPLEX VARIABLES FOR SCIENTISTS AND ENGINEERS.(3)
Prerequisite: MATH 241 or equivalent. The algebra of complex numbers, analytic functions, mapping properties of the elementary functions. Cauchy integral formula. Theory of residues and application to evaluation of integrals. Conformal mapping. (Credit will be given for only one of the courses—MATH 413 or MATH 463.)

MATH 464. INTRODUCTION TO THE METHODS OF MATHEMATICAL PHYSICS. (3)
Prerequisite: MATH 463 or 413, and MATH 246 or equivalent. Fourier series, Fourier and Laplace transforms. Evaluation of the complex version integral by the theory of residues. Applications to ordinary and partial differential equations of mathematical physics; solutions using transforms and separation of variables. Additional topics such as Bessel Functions and calculus of variations may be included.

MATH 470. INTRODUCTION TO NUMERICAL ANALYSIS. (3)
Prerequisite: MATH 241. Introduction to the analysis of numercial methods for solving linear systems of equations, nonlinear equations in one variable, interpolation and approximation problems and the solution of initial value problems for ordinary differential equations. Stress is placed on providing the student with a good understanding of the theoretical foundations of the various methods. Intended primarily for students in mathematics, applied mathematics, and computer science. This course should not be taken by students who have passed MATH/CMSC 460. (Listed also as CMSC 470.)

MATH 478. SELECTED TOPICS FOR TEACHERS OF MATHEMATICS. (1-3)
Prerequisite: One year of college mathematics or consent of instructor.

MATH 481. INTRODUCTION TO NUMBER THEORY. (3)
Prerequisite: One year of college mathematics or consent of instructor. Elementary number theory and the development of the real numbers for teachers. (Not open to students majoring in mathematics or physical sciences.)

MATH 482. INTRODUCTION TO ALGEBRA. (3)
Prerequisite: One year of college mathematics or consent of instructor. Modern ideas in algebra and the theory of equations for teachers. (Not open to students majoring in mathematics or physical sciences.)

MATH 483. INTRODUCTION TO GEOMETRY. (3)
Prerequisite: One year of college mathematics or consent of instructor. A study of basic ideas from Euclidean and non-Euclidean geometry for teachers. (Not open to students majoring in mathematics or physical sciences.)

MATH 484. INTRODUCTION TO ANALYSIS. (3)
Prerequisite: One year of college mathematics or consent of instructor. A study of the limit concept and the calculus for teachers. Previous knowledge of calculus is not required. (Not open to students majoring in mathematics or physical sciences.)

MATH 488. NATIONAL SCIENCE FOUNDATION SUMMER INSTITUTE FOR TEACHERS OF SCIENCE AND MATHEMATICS—SEMINAR. (1-3)
Lectures and discussion to deepen the student's appreciation of mathematics as a logical discipline and as a medium of expression. Special emphasis on topics relevant to current mathematical curriculum studies and revisions.

MATH 498. SELECTED TOPICS IN MATHEMATICS. (1-16)
Prerequisite: Permission of the instructor. Topics of special interest to advanced undergraduate students will be offered occasionally under the general guidance of the Departmental Committee on Undergraduate Studies. Honors students register for reading under this number.

METEOROLOGY

METO 301. THE ATMOSPHERIC ENVIRONMENT. (3)
Prerequisites: CHEM 103, PHYS 121, 122, or equivalent. This course will give a broad survey of the state of knowledge and problems of atmospheric science. It covers a wide range of topics, including origin, structure, and chemistry of the atmosphere; energy transformations, motions, and resulting weather; atmospheric optics and electricity; the water cycle; pollution and weather modification; atmospheric factors in ecology.

METO 410. DESCRIPTIVE AND SYNOPTIC METEOROLOGY. (3)
Prerequisites: MATH 241, PHYS 284 or equivalent. A survey of atmospheric phenomena, goals of research and techniques of study. This course would introduce the new student to the broad range of theoretical and applied studies in meteorology in order to acquaint him with the interaction of the physical and dynamical processes and the various scales of atmospheric phenomena. Some work in synoptic analysis and an introduction to methods of forecasting would be included.

METO 411. DESCRIPTIVE AND SYNOPTIC METEOROLOGY. (3)
Prerequisite: METO 410. A survey of atmospheric phenomena, goals of research and techniques of study. This course would introduce the new student to the broad range of theoretical and applied studies in meteorology in order to acquaint him with the interaction of the physical and dynamical processes and the various scales of atmospheric phenomena. Some work in synoptic analysis and an introduction to methods of forecasting would be included.

METO 412. PHYSICS AND THERMODYNAMICS OF THE ATMOSPHERE. (3)
Prerequisites: MATH 241, PHYS 284 or equivalent. Optical

phenomena, the radiation balance, introduction to cloud physics, atmospheric electrical phenomena, basic thermodynamic processes and their application to the atmosphere.

METO 420. PHYSICAL AND DYNAMICAL OCEANOGRAPHY. (3)
Prerequisite: METO 410 or a basic course in fluid dynamics such as ENME 340. Historical review of oceanography; physical, chemical, stratification and circulation properties of the ocean; dynamics of frictionless, frictional, wind driven and thermohaline circulation; air-sea interactions.

METO 422. OCEANIC WAVES, TIDES AND TURBULENCE. (3)
Prerequisite: METO 420. Introduction to the theory of oceanic wave motions; tides, wind waves, swells, storm surges, seiches, tsunamis, internal waves, turbulence, stirring, mixing and diffusion; probability, statistics and time series.

METO 434. AIR POLLUTION. (3)
Prerequisite: Senior standing in science or engineering or consent of the instructor. Three lectures per week. classification of atmospheric pollutants and their effects on visibility, inanimate and animate receptors. Evaluation of source emissions and principles of air pollution control; meteorological factors governing the distribution and removal of air pollutants; air quality measurements and air pollution control legislation.

MICROBIOLOGY

MICB 200. GENERAL MICROBIOLOGY. (4)
Two lectures and two two-hour laboratory periods a week. Prerequisite: Two semesters of chemistry. The biology of microorganisms, with special reference to the bacteria. Fundamental principles of microbiology as revealed through an examination of the structure, physiology, genetics, and ecology of microorganisms.

MICB 280. ECOLOGY AND MICROBIAL GENETICS. (3)
Three lectures a week. Prerequisite: 8 credits in microbiology or consent of instructor. Presentation of principles of ecology and genetics as they relate to microorganisms. Consideration of bacterial variation and its role in environmental selection and adaptation.

MICB 290. APPLIED MICROBIOLOGY. (4)
Two lectures and two two-hour laboratory periods a week. Prerequisite: MICB 200. The application of microorganisms and microbiological principles to milk, dairy products, and foods, industrial processes; soil; water and sanitation operations.

MICB 300. MICROBIOLOGICAL LITERATURE. (1)
One lecture period a week. Prerequisite: A major in microbiology. Introduction to periodical literature, methods, interpretation, and presentation of reports.

MICB 388. SPECIAL TOPICS IN MICROBIOLOGY. (1-4)
Prerequisite: 8 credits in microbiology, or consent of instructor. Presentation and discussion of special subjects in the field of microbiology. A maximum of 8 credit hours of MICB 388 may be applied to a major in microbiology.

MICB 399. MICROBIOLOGICAL PROBLEMS. (3)
Prerequisite: 16 credits in microbiology. Registration only upon the consent of the instructor. This course is arranged to provide qualified majors in microbiology and majors in applied fields an opportunity to pursue specific microbiological problems under the supervision of a member of the department.

MICB 400. SYSTEMATIC BACTERIOLOGY. (2)
Two lecture periods a week. Prerequisite: 8 credits in microbiology. History of bacterial classification; genetic relationships; international codes of nomenclature; bacterial variation as it affects classification.

MICB 410. HISTORY OF MICROBIOLOGY. (1)
One lecture period a week. Prerequisite: A major or minor in microbiology. History and integration of the fundamental discoveries of the science. The modern aspects of cytology, taxonomy, fermentation, and immunity in relation to early theories.

MICB 420. EPIDEMIOLOGY AND PUBLIC HEALTH. (2)
Two lecture periods a week. Prerequisite: MICB 200. History, characteristic features, and epidemiology of the important communicable diseases, public health administration and responsibilities; vital statistics.

MICB 440. PATHOGENIC MICROBIOLOGY. (4)
Two lectures and two two-hour laboratory periods a week. Prerequisite: MICB 200. The role of bacteria and fungi in the diseases of man with emphasis upon the differentiation and culture of microorganisms, types of disease, modes of disease transmission, prophylactic, therapeutic, and epidemiological aspects.

MICB 450. IMMUNOLOGY. (4)
Two lectures and two two-hour laboratory periods a week. Prerequisite: MICB 440. Principles of immunity; hypersensitiveness. Fundamental techniques of immunology.

MICB 460. GENERAL VIROLOGY. (4)
Two lectures and two two-hour laboratory periods a week. Prerequisite: MICB 440 or equivalent. Basic concepts regarding the nature of viruses and their properties, together with techniques for their characterization and identification.

MICB 470. MICROBIAL PHYSIOLOGY. (4)
Two lectures and two two-hour laboratory periods a week. Prerequisites: 8 credits in microbiology and CHEM 461, 462 or equivalent. Aspects of the growth, death, and energy transactions of microorganisms are considered, as well as the effects of the physical and chemical environment on them.

MICB 490. MICROBIAL FERMENTATIONS. (4)
Two lectures and two two-hour laboratory periods a week. Prerequisite: Consent of instructor. The application of quantitative techniques for measurement of enzyme reactions, mutations, fermentation, analyses, and other physiological processes of microorganisms.

MUSIC EDUCATION

MUED 352. MUSIC FOR THE ELEMENTARY CLASSROOM TEACHER. (2-3)
Prerequisite: MUSC 155 or consent of instructor. For non-music majors. Methods for guiding elementary school students in musical experiences; development of objectives, and a survey of instructional materials.

MUED 410. METHODS AND MATERIALS FOR CLASS INSTRUMENTAL INSTRUCTION. (2)
Prerequisite: Previous or concurrent registration in MUSC 113-213. Two one-hour laboratories and one lecture per week. Teaching techniques and rehearsal techniques for beginning and intermediate instrumental classes—winds, strings and percussion.

MUED 420. BAND AND ORCHESTRA TECHNIQUES AND ADMINISTRATION. (2-3)
Prerequisite: MUSC 113-213 and 491. Comprehensive study of instructional materials, rehearsal techniques, program planning, and band pageantry for the high school instrumental program. Organization, scheduling, budgeting and purchasing are included.

MUED 438. SPECIAL PROBLEMS IN THE TEACHING OF INSTRUMENTAL MUSIC. (2-3)
Prerequisite: MUSC 113-213 or the equivalent. A study, through practice on minor instruments, of the problems encountered in public school teaching of orchestral instruments. Literature and teaching materials, minor repairs, and adjustment of instruments are included. The course may be taken for credit three times since

one of four groups of instruments, strings, woodwind, brass or percussion will be studied each time the course is offered.

MUED 450. MUSIC IN EARLY CHILDHOOD EDUCATION. (3)
Prerequisite: MUSC 155 or equivalent. Creative experiences in songs and rhythms, correlation of music and everyday teaching with the abilities and development of each level; study of songs and materials; observation and teaching experience with each age level.

MUED 460. CREATIVE ACTIVITIES IN THE ELEMENTARY SCHOOL. (2-3)
Prerequisite: Music methods of teaching experience. A study of the creative approach to the development of music experiences for children in the elementary grades emphasizing contemporary music and contemporary music techniques.

MUED 462. MUSIC FOR THE ELEMENTARY SCHOOL SPECIALIST. (2-3)
Prerequisite: Consent of instructor. Teaching techniques and instructional materials for the music program in the elementary schools. For the music specialist.

MUED 470. MUSIC IN SECONDARY SCHOOLS. (2-3)
Prerequisite: Consent of instructor. A study of the music program in the junior and senior high school with emphasis on objectives, organization of subject matter, teaching techniques and materials for general music classes.

MUED 472. METHODS AND MATERIALS IN VOCAL MUSIC FOR SECONDARY SCHOOLS. (2-4)
Prerequisite: Consent of instructor. A survey of repertoire and methods for teaching choral groups and voice classes. Diction, interpretation, tone production, intonation, phrasing rehearsal techniques and style characteristics.

MUED 480. THE VOCAL MUSIC TEACHER AND SCHOOL ORGANIZATION. (2)
Prerequisite: Student teaching, previous or concurrent. The role of the vocal music specialist in the implementation of the supervision and administration of the music programs in the elementary and secondary schools. Open to graduate students by permission of instructor.

MUED 499. WORKSHOPS, CLINICS, INSTITUTES. (2-6)
Innovative and experimental dimensions of music education will be offered to meet the needs of music teachers and music supervisors and to allow students to individualize their programs. The maximum number credits that may be earned under this course symbol toward any degree is six semester hours; the symbol may be used two or more times until six semester hours have been reached.

MUSIC

MUSC 099. APPLIED MUSIC. (2-4)
(See below for description).

MUSC 100. CLASS VOICE. (2)
Four hours per week. A laboratory course in which a variety of voices and vocal problems are represented. Principles of correct breathing as applied to singing; fundamentals of tone production and diction. Students are taught to develop their own voices. Repertoire of folk songs and songs of the Classical and Romantic periods.

MUSC 102. CLASS PIANO. (2)
Four hours per week. Functional piano training for beginners. Development of techniques useful for school and community playing. Basic piano techniques; chord, arpeggio, and scale techniques; melody and song playing; simple accompaniments, improvisation for accompaniments and rhythms; sight reading and transposition, and playing by ear.

MUSC 103. CLASS PIANO. (2)
Four hours per week. Functional piano training for beginners. Development of techniques useful for school and community playing. Basic piano techniques; chord, arpeggio, and scale techniques; melody and song playing; simple accompaniments, improvisation for accompaniments and rhythms; sight reading and transposition, and playing by ear. MUSC 103 is a continuation of MUSC 102; elementary repertoire is begun.

MUSC 106. APPLIED MUSIC. (2)
(See below for description.)

MUSC 107. APPLIED MUSIC. (2)
(See below for description.)

MUSC 108. APPLIED MUSIC. (2-4)
(See below for description.)

MUSC 109. APPLIED MUSIC. (2-4)
(See below for description.)

MUSC 110. CLASS STUDY OF STRING INSTRUMENTS. (2)
Open only to majors in musical education (vocal option). Four laboratory hours per week. Basic principles of string playing, and a survey of all string instruments.

MUSC 111. CLASS STUDY OF WIND AND PERCUSSION INSTRUMENTS. (2)
Open only to majors in musical education (vocal option). Four laboratory hours per week. A survey of wind and percussion instruments with emphasis on ensemble training. The student will acquire an adequate playing technique on one instrument and gain an understanding of the acoustical and construction principles of the others.

MUSC 113. CLASS STUDY—VIOLIN. (2)
Open only to majors in music education (instrumental option). Four laboratory hours per week. A study of the violin with emphasis on ensemble training. The student will acquire an adequate playing technique.

MUSC 114. CLASS STUDY—CELLO AND BASS. (2)
Open only to majors in music education (instrumental option). Four laboratory hours per week. A study of the instruments with emphasis on ensemble training. The student will acquire an adequate playing technique.

MUSC 116. CLASS STUDY—CLARINET. (2)
Open only to majors in music education (instrumental option). Four laboratory hours per week. A study of the clarinet with emphasis on ensemble training. The student will acquire an adequate playing technique.

MUSC 117. CLASS STUDY, FLUTE, OBOE, BASSOON, AND SAXOPHONE. (2)
Open only to majors in music education (instrumental option). Four laboratory hours per week. A study of the instruments with emphasis on ensemble training. The student will acquire an adequate playing technique on two to four instruments, and an understanding of the acoustical and construction principles of the others.

MUSC 120. CLASS STUDY—CORNET. (2)
Open only to majors in music education (instrumental option). Four laboratory hours per week. A study of the cornet with emphasis on ensemble training. The student will acquire an adequate playing technique.

MUSC 121. CLASS STUDY—HORN, TROMBONE, EUPHONIUM, AND TUBA. (2)
Open only to majors in music education (instrumental option). Four laboratory hours per week. A study of the instruments with emphasis on ensemble training. The student will acquire an adequate playing technique on two to four instruments, and an understanding of the acoustical and construction principles of the others.

MUSC 122. CLASS STUDY—PERCUSSION. (2)
Open only to majors in music education (instrumental option). Four laboratory hours per week. A study of the instruments with emphasis on ensemble training. The student will acquire an adequate playing technique on two to four instruments, and an understanding of the acoustical and construction principles of the others.

MUSC 129. ENSEMBLE. (1)

A—Men's Glee Club
B—Women's Chorus
C—Chapel Choir
D—Chamber Chorus
E—Madrigal Singers
F—Opera Workshop
G—University Orchestra
H—Theater Orchestra
I—Band
J—Brass Choir
K—Percussion
L—Clarinet Choir
M—Saxophone
N—String
O—Woodwind Quintet
P—Keyboard
Q—Chamber Orchestra
R—Instrumental Consort
S—Twentieth Century
T—Jazz
U—Guitar
Z—University Chorus

Three laboratory hours per week. Rehearsal and performance of selected works for small ensembles of instruments, piano, or small vocal groups. After two registrations in MUSC 129 the student will elect MUSC 229 for two additional semesters, and MUSC 329 thereafter. In addition to indicating the course number (129, 229, 329) the student will indicate a suffix.

MUSC 130. SURVEY OF MUSIC LITERATURE. (3)
Three lectures and one laboratory hour per week. Open to all students except music and music education majors. MUSC 130 and 131 may not both be taken for credit. A study of the principles upon which music is based, and an introduction to the musical repertoires performed in America today.

MUSC 131. INTRODUCTION TO MUSIC. (3)
Open only to music or music education majors; other students take MUSC 130. MUSC 130 and 131 may not both be counted for credit. A study of the forms and styles of music, leading to an intelligent appreciation of the art and providing a foundation for more advanced courses in the Department of Music.

MUSC 135. BASIC NOTATIONAL SKILLS. (2)
Three hours per week. An introductory course in fundamentals of music notation and the development of aural skills. May not be used in fulfillment of degree requirements by majors in music.

MUSC 150. THEORY OF MUSIC. (3)
Two lectures and three laboratory hours per week. A fundamental course in the elements of music. Study of rhythms, scales, chord structures, and tonalities through ear training, sight singing, and keyboard drill.

MUSC 151. THEORY OF MUSIC. (3)
Two lectures and three laboratory hours per week. A fundamental course in the elements of music. Study of rhythms, scales, chord structures, and tonalities through ear training, sight singing, and keyboard drill. The student must achieve a grade of C in MUSC 151 in order to register for MUSC 250.

MUSC 155. FUNDAMENTALS FOR THE CLASSROOM TEACHER. (3)
Open to students majoring in elementary education or childhood education; other students take MUSC 150. MUSC 150 and 155 may not both be counted for credit. The fundamentals of music theory and practice, related to the needs of the classroom and kindergarten teacher, and organized in accord with the six-area concept of musical learning.

MUSC 200. ADVANCED CLASS VOICE. (2)
Four hours per week. Prerequisite: MUSC 101 or equivalent vocal training. Continuation of MUSC 101, with more advanced repertoire for solo voice and small ensembles. A special section for music-education majors will include the study of methods and materials for teaching class voice.

MUSC 201. ADVANCED CLASS VOICE. (2)
Four hours per week. Prerequisite: MUSC 101 or equivalent vocal training. Continuation of MUSC 101, with more advanced repertoire for solo voice and small ensembles. A special section for music education majors will include the study of methods and materials for teaching class voice.

MUSC 202. ADVANCED CLASS PIANO. (2)
Four hours per week. Prerequisite: MUSC 103 or equivalent piano training. Advanced keyboard techniques. Continuation of skills introduced in MUSC 103, transposition, modulation, and sight reading; methods of teaching functional piano.

MUSC 203. ADVANCED CLASS PIANO. (2)
Four hours per week. Prerequisite. MUSC 202 of equivalent piano training. Advanced keyboard techniques. Continuation of skills introduced in MUSC 202. Transposition, modulation, and sight reading; methods of teaching functional piano. Development of style in playing accompaniments and in playing for community singing. More advanced repertoire.

MUSC 206. APPLIED MUSIC. (2)
(See below for description.)

MUSC 207. APPLIED MUSIC. (2)
(See below for description.)

MUSC 208. APPLIED MUSIC. (2-4)
(See below for description.)

MUSC 209. APPLIED MUSIC. (2-4)
(See below for description.)

MUSC 213. ADVANCED CLASS STRINGS. (2)
Open only to majors in music education (instrumental option). Four laboratory hours per week. A study of the instruments with emphasis on ensemble training.

MUSC 228. PIANO SIGHT READING, ACCOMPANYING AND IMPROVISATION. (2)
Prerequisite: Completion or current registration in MUSC 208A. Four laboratory hours per week. A course designed to improve sight-reading fluency for pianists. Emphasis on vocal and instrumental accompanying and chamber music. Development of ability to improvise and transpose. May be repeated for credit.

MUSC 229. ENSEMBLE. (1)

A—Men's Glee Club
B—Women's Chorus
C—Chapel Choir
D—Chamber Chorus
E—Madrigal Singers
F—Opera Workshop
G—University Orchestra
H—Theater Orchestra
I—Band
J—Brass Choir
K—Percussion
L—Clarinet Choir
M—Saxophone
N—String
O—Woodwind Quintet
P—Keyboard
Q—Chamber Orchestra
R—Instrumental Consort
S—Twentieth Century
T—Jazz
U—Guitar
Z—University Chorus

Three laboratory hours per week. Rehearsal and performance of selected works for small ensembles of instruments, piano, or small vocal groups. After two registrations in MUSC 129 the student will elect MUSC 229 for two additional semesters, and MUSC 329 thereafter. In addition to indicating the course number (129, 229, 329) the student will indicate a suffix.

MUSC 250. ADVANCED THEORY OF MUSIC. (4)
Prerequisite: MUSC 151 with a grade of at least C. Three lectures and two laboratory hours per week. An integrated course of written harmony, keyboard harmony, and ear training. Continuation of the principles studied in MUSC 151. Harmonic progressions; MUSC 250, 18th century chorale style. Realization of figured basses, and composition in the smaller forms. Advanced study of solfege, with drill in melodic, rhythmic, and harmonic dictation.

MUSC 251. ADVANCED THEORY OF MUSIC. (4)
Prerequisite: MUSC 151 with a grade of at least C. Three lectures and two laboratory hours per week. An integrated course of written harmony, keyboard harmony, and ear training. Continuation of the principles studied in MUSC 151. Harmonic progressions; 19th century styles including chromatic and modulatory techniques. Realization of figured basses, and composition in the smaller forms. Advanced study of solfege, with drill in melodic, rhythmic, and harmonic dictation.

MUSC 329. ENSEMBLE. (1)

A—Men's Glee Club	L—Clarinet Choir
B—Women's Chorus	M—Saxophone
C—Chapel Choir	N—String
D—Chamber Chorus	O—Woodwind Quintet
E—Madrigal Singers	P—Keyboard
F—Opera Workshop	Q—Chamber Orchestra
G—University Orchestra	R—Instrumental Consort
H—Theater Orchestra	S—Twentieth Century
I—Band	T—Jazz
J—Brass Choir	U—Guitar
K—Percussion	Z—University Chorus

Three laboratory hours per week. Rehearsal and performance of selected works for small ensembles of instruments, piano, or small vocal groups. After two registrations in MUSC 129 the student will elect MUSC 229 for two additional semesters, and MUSC 329 thereafter. In addition to indicating the course number (129, 229, 329) the student will indicate a suffix.

MUSC 330. HISTORY OF MUSIC. (3)
Prerequisites: MUSC 130 or 131 and junior standing. A study of musical styles from their origins in western Europe to their present-day manifestations. The interaction of music and other cultural activities. This course covers the Greek period to Bach.

MUSC 331. HISTORY OF MUSIC. (3)
Prerequisites: MUSC 130 or 131 and junior standing. A study of musical styles from their origins in Western Europe to their present-day manifestations. The interactiion of music and other cultural activities. This course course covers Bach to the present.

MUSC 339. HONORS READING COURSE. (2-3)
Prerequisites: Junior standing and consent of Honors Committee. Selected readings in the history, literature and theory of music. The course may be repeated for credit at the discretion of the committee.

MUSC 358. AURAL MUSICAL SKILLS (3)
Development of advanced skills in aural perception of pitch, melody, rhythm, harmony, text, texture, and timbre heard in a variety of media. A development course for graduate students. May be repeated for credit.

MUSC 400. MUSIC PEDAGOGY. (3)
Conference course. Prerequisite or corequisite: MUSC 418 or a more advanced course in applied music. A study of major pedagogical treatises in music, and an evaluation of pedagogical techniques, materials, and procedures.

MUSC 406. APPLIED MUSIC. (2)
(See below for description).

MUSC 407. APPLIED MUSIC. (2)
(See below for description).

MUSC 408. APPLIED MUSIC. (2-4)
(See below for description.)

MUSC 409. APPLIED MUSIC. (2-4)
(See below for description.)

MUSC 416. APPLIED MUSIC. (2)
(See below for description.)

MUSC 417. APPLIED MUSIC. (2)
(See below for description.)

MUSC 418. APPLIED MUSIC. (2-4)
(See below for description.)

MUSC 419. APPLIED MUSIC. (2-4)
(See below for description.)

MUSC 430. MUSIC LITERATURE SURVEY FOR THE NON-MAJOR. (3)
Prerequisite: MUSC 130 or the equivalent. Open to all students except music and music education majors. Selected compositions are studied from the standpoint of the informed listener. Choral music, opera, and art song.

MUSC 431. MUSIC LITERATURE SURVEY FOR THE NON-MAJOR. (3)
Prerequisite: MUSC 130 or the equivalent. Open to all students except music and music education majors. Selected compositions are studied from the standpoint of the informed listener. Orchestral, chamber, and keyboard music.

MUSC 440. KEYBOARD MUSIC. (3)
Prerequisite: MUSC 330, 331, or the equivalent. The history and literature of harpsichord, organ, and piano music from the Baroque period to the present. Suites, sonatas and smaller forms are studied with emphasis on changes of style and idiom.

MUSC 441. CHAMBER MUSIC. (3)
Prerequisite: MUSC 330, 331, or the equivalent. The history and literature of chamber music from the early Baroque period to the present. Music for trio sonata, string quartet and quintet, and combinations of piano and strings.

MUSC 442. SYMPHONIC MUSIC. (3)
Prerequisite: MUSC 330, 331, or the equivalent. The study of orchestral music from the Baroque period to the present. The concerto, symphony, overture, and other forms are examined.

MUSC 443. SOLO VOCAL LITERATURE. (3)
Prerequisite: MUSC 330, 331, or the equivalent. The study of solo vocal literature from the Baroque cantata to the art song of the present. The *Lied, melodie,* vocal chamber music, and the orchestral song are examined.

MUSC 444. CHORAL MUSIC. (3)
Prerequisite: MUSC 330, 331, or the equivalent. The history and literature of choral music from the Renaissance to the present, with discussion of related topics such as Gregorian chant, vocal chamber music, etc.

MUSC 445. SURVEY OF THE OPERA. (3)
Prerequisite: MUSC 330, 331, or the equivalent. A study of the music, librettos and composers of the standard operas.

MUSC 446. CONTEMPORARY MUSIC. (3)
Prerequisite: MUSC 330, 331, or the equivalent. A study of music written in contemporary idioms since Debussy. Changes in form and performing media in the twentieth century. Electronic music and other experimental types.

MUSC 448. SPECIAL TOPICS IN MUSIC. (2-6)
Prerequisite: Permission of the instructor. Repeatable to a maximum of six semester hours.

MUSC 450. MUSICAL FORM. (3)
Prerequisite: MUSC 250, 251. A study of the organizing principles of musical composition, their interaction in musical forms, and their functions in different styles.

MUSC 460. COUNTERPOINT. (2)
Prerequisite: MUSC 250, 251. A course in eighteenth-century contrapuntal techniques. Study of devices of imitation in the invention and the choral prelude. Original writing in the smaller contrapuntal forms.

MUSC 461. COUNTERPOINT. (2)
Prerequisite: MUSC 250, 251. A course in 18th century contrapuntal techniques. Study of devices of imitation in the invention and the choral prelude. Original writing in the smaller contrapuntal forms.

MUSC 462. MODAL COUNTERPOINT. (2)
Prerequisite: MUSC 251 or the equivalent. An introduction to the contrapuntal techniques of the sixteenth century: the structure of the modes, composition of modal melodies, and contrapuntal writing for two, three and four voices.

MUSC 465. CANON AND FUGUE. (3)
Prerequisite: MUSC 461 or the equivalent. Composition and analysis of the canon and fugue in the styles of the eighteenth, nineteenth and twentieth centuries.

MUSC 470. HARMONICS AND CONTRAPUNTAL PRACTICES OF THE 20th CENTURY. (2)
Prerequisites: MUSC 251 and 460 or the equivalents. A theoretical study of twentieth-century materials: scales, modes, intervals, chord structures, poly-harmony, and serial and twelve-tone organization.

MUSC 478. COMPOSITION. (2)
Prerequisite: MUSC 250, 251. Principles of musical composition, and their application to the smaller forms. Original writing in nineteenth and twentieth century musical idioms for various media.

MUSC 479. COMPOSITION. (2)
Prerequisite: MUSC 250, 251. Principles of musical composition, and their application to the smaller forms. Original writing in 19th and 20th century musical idioms for various media.

MUSC 486. ORCHESTRATION. (2)
Prerequisite: MUSC 250, 251. A study of the ranges, musical functions, and technical characteristics of the instruments, and their color possibilities in various combinations. Practical experience in orchestrating for small and large ensembles.

MUSC 487. ORCHESTRATION. (2)
Prerequisite: MUSC 250, 251. A study of the ranges, musical functions, and technical characteristics of the instruments, and their color possibilities in various combnations. Pracitcal experience in orchestrating for small and large ensembles.

MUSC 490. CONDUCTING. (2)
A laboratory course in conducting vocal and instrumental groups. Baton technique, score reading, rehearsal techniques, tone production, style, and interpretation. Music of all periods will be introduced.

MUSC 491. CONDUCTING. (2)
Prerequisite: MUSC 490 or equivalent. A laboratory course in conducting vocal and instrumental groups. Baton technique, score reading, rehearsal techniques, tone production, style, and interpretation. Music of all periods will be introduced.

MUSC 495. ACOUSTICS FOR MUSICIANS. (3)
Prerequisites: MUSC 251 or the equivalent, and senior or graduate standing in music. The basic physics of music, acoustics of musical instruments and music theory, physiological acoustics, and musico-architectural acoustics.

APPLIED MUSIC

New students or students taking Applied Music for the first time at this University:

MUSC 099. (2-4)
Prerequisite: Permission of department chairman. The proper course classification will be determined for each student at the end of his first semester in the department. Special fee of $40.00 per term.

MUSIC MAJORS ONLY: (2-4)
One-hour lesson and six practice hours per week if taken for two hours credit; or one-hour lesson and 15 practice hours per week if taken for four hours credit. Prerequisite: The next lower course on the same instrument. Special fee $40.00 per term.

MUSC 108, 109. FRESHMAN COURSES.
The four hour course is for piano majors in the B.MUS. curriculum only.

MUSC 208, 209. SOPHOMORE COURSES.
The four hour course is for instrumental majors in the B.MUS. curriculum only.

MUSC 408, 409. JUNIOR COURSES.
The four hour course is for instrumental majors in the B.MUS. curriculum only.

MUSC 418, 419. SENIOR COURSES.
The four hour course is for instrumental or vocal majors in the B.MUS. curriculum only.

NON-MUSIC MAJORS AND MUSIC MAJORS ELECTING A SECONDARY INSTRUMENT: (2)
Half-hour lesson and six practice hours per week. Prerequisite: Permission of department chairman and the next lower course on the same instrument. Special fee of $40.00 per term.

MUSC 106, 107. FRESHMAN COURSES.

MUSC 206, 207. SOPHOMORE COURSES.

MUSC 406, 407. JUNIOR COURSES.

MUSC 416, 417. SENIOR COURSES.

INSTRUMENT DESIGNATION:
Each student taking an applied music course must indicate the instrument chosen by adding a suffix to the proper course number as: MUSC 106A Applied Music—Piano.

Suffix *Instrument*	*Suffix* *Instrument*	*Suffix* *Instrument*
A—Piano	H—Oboe	O—Tuba
B—Voice	I—Clarinet	P—Euphonium
C—Violin	J—Bassoon	Q—Percussion
D—Viola	K—Saxophone	R—Organ
E—Cello	L—Horn	S—Guitar
F—Bass	M—Trumpet	
G—Flute	N—Trombone	

NUTRITIONAL SCIENCE

NUSC 402. FUNDAMENTALS OF NUTRITION. (3)
Three lectures per week. A study of the fundamental role of all nutrients in the body, including their digestion, absorption and metabolism. Dietary requirements and nutritional deficiency syndromes of laboratory and farm animals and man will be considered. This course will be for both graduate and undergraduate credit, with additional assignments given to the graduate students.

NUSC 403. APPLIED ANIMAL NUTRITION. (3)
Two lectures and one laboratory period per week. Prerequisites: MATH 110, NUSC 402 or permission of instructor. A critical study of those factors which influence the nutritional requirements of ruminants, swine and poultry. Practical feeding methods and procedures used in formulation of economically efficient rations will be presented.

NUSC 415. MATERNAL, INFANT AND CHILD NUTRITION. (2)
Two lectures per week. Prerequisite: Course in basic nutrition. Nutritional needs of the mother, infant and child and the relation of nutrition to physical and mental growth.

NUSC 425. INTERNATIONAL NUTRITION. (2)
Two lectures per week. Prerequisite: Course in basic nutrition. Nutritional status of world population and local, national, and international programs for improvement.

NUSC 435. HISTORY OF NUTRITION. (2)
Two lectures per week. Prerequisite: Course in basic nutrition. A study of the development of the knowledge of nutrition and its interrelationship with social and economic development.

NUSC 450. ADVANCED HUMAN NUTRITION. (3)
First semester. Two lectures and one two-hour laboratory. Prerequisites: NUSC 402 or NUTR 300, CHEM 461, 462 or concurrent registration or permission of instructor. A critical study of the physiological and metabolic influences on nutrient utilization, particular emphasis on current problems in human nutrition.

NUSC 460. THERAPEUTIC HUMAN NUTRITION. (3)
Second semester. Prerequisite: NUSC 402 or NUTR 300. Two lectures and laboratory period per week. Modification of normal adequate diet to meet human nutritional needs in pathological conditions.

NUTRITION

NUTR 100. ELEMENTS OF NUTRITION. (3)
Three lectures per week. Fundamentals of human nutrition. Nutrient requirements related to changing individual and family needs. For nondepartmental majors.

NUTR 200. NUTRITION FOR HEALTH SERVICES. (3)
Prerequisites: CHEM 103, ZOOL 101. Two lectures and one two-hour laboratory. A study of nutritional status and the effect of food habits and food consumption on family health. Nutritional requirements for individuals in different stages of development. Techniques and procedures for the application of nutrition knowledge with consideration of various economic levels and social backgrounds.

NUTR 300. SCIENCE OF NUTRITION. (4)
Prerequisites: ZOOL 101 and CHEM 104. Three lectures and one two-hour laboratory. An understanding of the chemical and physiological utilization of nutrients present in food as related to individual human nutrition status; includes digestion and absorption, requirements, deficiencies.

NUTR 415. MATERNAL, INFANT AND CHILD NUTRITION. (2)
Two lectures per week. Prerequisite: Course in basic nutrition. Nutritional needs of the mother, infant and child and the relation of nutrition to physical and mental growth.

NUTR 425. INTERNATIONAL NUTRITION. (2)
Two lectures per week. Prerequisite: Course in basic nutrition. Nutritional status of world population and local, national and international programs for improvement.

NUTR 435. HISTORY OF NUTRITION. (2)
Two lectures per week. Prerequisite: Course in basic nutrition. A study of the development of the knowledge of nutrition and its interrelationship with social and economic developments.

NUTR 450. ADVANCED HUMAN NUTRITION. (3)
Prerequisites: Consent of department and NUSC 402 or NUTR 300; CHEM 461, or concurrent registration. Two lectures and one two-hour laboratory. A critical study of the physiological and metabolic influences on nutrient utilization, particular emphasis on current problems in human nutrition.

NUTR 460. THERAPEUTIC HUMAN NUTRITION. (3)
Two lectures and one laboratory period a week. Prerequisites: NUTR 300, 450. Modifications of the normal adequate diet to meet human nutritional needs in pathological conditions.

NUTR 470. COMMUNITY NUTRITION. (3)
Prerequisites: NUTR 300, 450, 460. A study of different types of community nutrition programs, problems and projects.

NUTR 480. APPLIED DIET THERAPY. (3)
(Open only to students accepted into and participating in the U.S. Army dietetic internship program at Walter Reed General Hospital or the coordinated undergraduate dietetics program.) Application of principles of normal and therapeutic nutrition in total medical care and instruction of patients. Clinical experience in hospital therapeutics, pediatrics, research and a variety of clinics are included. For students in the coordinated undergraduate dietetics program 12 hours per week clinical experience is required and this course must be accompanied by NUTR 460.

NUTR 485. APPLIED COMMUNITY NUTRITION. (3)
Prerequisite: NUTR 460 and concurrent registration in NUTR 470. (Open only to students accepted into and participating in the coordinated undergraduate program in dietetics.) Application of principles in community nutrition through guided experiences in different aspects of nutrtion programs in the community. Twelve hours of field experience per week is required.

NUTR 490. SPECIAL PROBLEMS IN NUTRITION. (2-3)
Prerequisites: NUTR 300 and consent of instructor. Individual selected problems in the area of human nutrtion.

PHYSICAL EDUCATION

PHED 100-127. PHYSICAL EDUCATION ACTIVITIES—MEN

PHED 130-157. PHYSICAL EDUCATION ACTIVITIES—WOMEN

PHED 158. ADAPTED PHYSICAL EDUCATION—COED

PHED 160-177. PHYSICAL EDUCATION ACTIVITIES—COED

PROFESSIONAL PROGRAM COURSES:

PHED 180. INTRODUCTION TO PHYSICAL EDUCATION. (2)
An orientation to the profession, including the relationship of physical education to education, current trends and practices, career opportunities, and areas of research.

PHED 181. FUNDAMENTALS OF MOVEMENT. (2)
Open to women, three hours a week. Introduction to analysis of muscular activity, conditioning exercises and programs, improvement of physical fitness, and analysis of the relationship of mechanical principles to basic movement and skills.

PHED 182. RHYTHMIC ACTIVITIES. (2)
Six hours a week. Development of rhythmic sensitivity through analysis of rhythm and its application to movement, skills in folk, square and social dance, teaching techniques for use in schools and recreational programs.

PHED 183. ELEMENTARY SCHOOL RHYTHMIC ACTIVITIES. (2)
A survey of the various types of rhythmic activities suitable for use in the elementary school. Basic rhythms, singing games, and folk and square dancing are considered.

PHED 184. ELEMENTARY SCHOOL SKILLS AND SELF-TESTING ACTIVITIES. (2)
A survey of the various types of skills, stunts, and tumbling suitable for use in the elementary school.

PHED 185. SKILLS LABORATORY. (2)
Open to men, first semester. Six hours a week. Progressive techniques and practice of skills in selected and individual sports as apparatus, soccer, track and field, and tumbling and trampolining.

PHED 186. SKILLS LABORATORY. (2)
Open to women, first semester. Six hours a week. Progressive techniques, knowledges and practice of selected team and individual sports as field hockey, basketball, volleyball, and track and field.

PHED 187. SKILLS LABORATORY. (2)
Open to men, second semester. Six hours a week. Progressive techniques and practice of skills in selected and individual sports as apparatus, soccer, track and field, and tumbling and trampolining.

PHED 190. SKILLS LABORATORY. (2)
Open to women, second semester. Six hours a week. Progressive techniques, knowledges and practice of selected team and individual sports as field hockey, basketball, volleyball, and track and field.

PHED 191. ELEMENTARY SWIMMING. (1)
Open to men. Progressive techniques and practice of elementary swimming including basic and intermediate swimming instruction.

PHED 192. ELEMENTARY SWIMMING AND DIVING. (1)
Open to women, three hours a week. Progressive techniques and practice in the elementary phase of swimming and diving, designed to make the student self-sufficient in deep water.

PHED 218. LABORATORY IN TEACHING. (1)
Prerequisite: Students are eligible who have completed a minimum of 36 semester hours of credit with appropriate knowledge and experience in the selected activity area or with permission of instructor. The course is de-

signed to prepare the student for the student teaching experience by assisting in a class. May be repeated to a maximum of 2 credit hours.

PHED 261. SKILLS LABORATORY. (2)
Open to men. First semester. Six hours a week. Progressive techniques and practice of skills in selected team and individual sports as football, wrestling, basketball, and baseball.

PHED 262. SKILLS LABORATORY. (2)
Open to women. First semester. Six hours a week. Techniques, knowledge, and practice of selected team and individual sports as softball, field games, stunts and tumbling, apparatus, and tennis.

PHED 263. SKILLS LABORATORY. (2)
Open to men. Second semester. Six hours a week. Progressive techniques and practice of skills in selected team and individual sports as football, wrestling, basketball, and baseball.

PHED 264. SKILLS LABORATORY. (2)
Open to women. Second semester. Six hours a week. Techniques, knowledge, and practice of selected team and individual sports as softball, field games, stunts and tumbling, apparatus, and tennis.

PHED 265. SKILLS LABORATORY. (2)
Three hours a week. Prerequisite: PHED 161 or 162. Complex gymnastic activities above the elementary phase.

PHED 270. INTERMEDIATE SWIMMING AND DIVING. (1)
Open to women. Three hours a week. Prerequisite: PHED 172 or equivalent. Progressive techniques and practice of skills in swimming and diving.

PHED 271. ADVANCED SWIMMING. (1)
Open to men. Prerequisite: PHED 171 or equivalent. Progressive techniques and practice of advanced swimming skills, water stunts and survival swimming.

PHED 272. ADVANCED SWIMMING AND LIFE SAVING. (1)
Open to women. Three hours a week. Prerequisite: PHED 270. American Red Cross senior life saving, advanced swimming, and diving are included.

PHED 273. LIFE SAVING AND WATER SAFETY. (1)
Open to men. Three hours a week. Prerequisite: PHED 271 or equivalent. Progressive techniques and practice of life saving and water safety skills. Course includes the senior life saving material of the American Red Cross and the YMCA.

PHED 274. METHODS OF AQUATICS. (2)
M—MEN
Three hours a week. Prerequisite: PHED 271 or equivalent. Training for aquatic leadership in schools, camps and clubs. Included are teaching methods, administration, facilities, and equipment.

W—WOMEN
Three hours a week. Prerequisite: PHED 172 or equivalent. Training for aquatic leadership in schools, camps and clubs. Included are teaching methods, organization and administration, analysis of competitive swimming, synchronized swimming, diving, and equipment and pool maintenance.

PHED 276. WATER SAFETY. (1)
Open to women. Three hours a week. Prerequisite: Current American Red Cross senior life saving certificate. Principles and techniques of teaching swimming and life saving.

PHED 277. FANCY DIVING. (1)
Open to men. Three hours a week. Progressive techniques and practice of fancy diving. Course will include work on the five categories of dives.

PHED 282. ORGANIZATION AND ADMINISTRATION OF INTRAMURALS. (1)
Open to women. Three hours a week. Organization and administration of intramural programs and tournaments and techniques of officiating women's sports. Opportunity to qualify for officials' ratings in hockey and basketball.

PHED 287. SPORT AND AMERICAN SOCIETY. (3)
Sport will be related to such social problems as delinquency, segregation, collective behavior, and leisure; to social processes such as socialization, stratification, mobility, and social control; and to those familiar social institutions, the family, the school, the church, the military, the economy, the polity, and the mass media.

PHED 301. ORGANIZATION AND OFFICIATING IN INTRAMURALS. (1)
Organization, administration, and promotion of intramurals at various school levels. Included are types of tournaments, units of competition, handling of student leader personnel.

PHED 303. ORGANIZATION AND OFFICATING IN INTRAMURALS. (1)
Organization, administration, and promotion of intramurals at various school levels. Included are types of tournaments, units of competition, handling of student leader personnel.

PHED 305. SKILLS LABORATORY. (2)
M—MEN
Four hours a week. Experience in individual and dual motor skills.

W—WOMEN
Four hours a week. Knowledge, techniques and practice in selected team, individual and dual sports.

PHED 307. SKILLS LABORATORY. (2)
M—MEN
Four hours a week. Experience in individual and dual motor skills.

W—WOMEN
Four hours a week. Knowledge, techniques and practice in selected team, individual and dual sports.

PHED 314. METHODS IN PHYSICAL EDUCATION FOR SECONDARY SCHOOLS. (3)
Three lecture hours a week. Application of educational philosophy and principles to class organization and techniques of teaching physical education in the junior and senior high schools. Students are normally enrolled during the student teaching semester.

PHED 323. COACHING ATHLETICS. (2)
Two lecture hours a week. Theory of coaching the various competitive sports commonly found in high school and college programs.

PHED 324. COACHING ATHLETICS. (2)
Open to women. Three hours a week. General theory and psychology of coaching, theory and practice of coaching selected competitive sports found in the secondary schools and community recreation programs.

PHED 325. COACHING ATHLETICS. (2)
Two lecture hours a week. Theory of coaching the various competitive sports commonly found in high school and college programs.

PHED 326. COACHING ATHLETICS. (2)
Two lecture hours a week. Theory of coaching the various competitive sports commonly found in high school and college programs.

PHED 330. FUNDAMENTALS OF BODY DYNAMICS. (3)
Acquaintance of the elementary teacher with the scientific principles of mechanical-anatomical analysis and physiology of activities relating to physical growth and development.

PHED 333. ADAPTED PHYSICAL EDUCATION. (2)
Lecture and laboratory. Application of kinesiological and physiological principles to handicapped students; designed to help prospective teachers meet exercise needs of those pupils with disabilities.

PHED 335. COACHING SWIMMING AND DIVING. (2)
Three hours a week. Analysis of the techniques of coaching swimming and diving. Included is a systematic treat-

ment of the philosophy, historical development and psychological theories of coaching aquatics.

PHED 381. ADVANCED TRAINING AND CONDITIONING. (3)
Three hours a week. Theoretical and practical foundations of the prevention, recognition and treatment of athletic injuries. Physical conditioning and re-conditioning, preventive taping, first aid, and various modalities are emphasized.

PHED 398. HONORS SEMINAR. (1)
H—HONORS
Prerequisite: Participation in honors program. One discussion period a week. Guided discussion of research topics of current interest. Repeatable to a total of 3 hours credit.

PHED 399. HONORS THESIS. (3)
H—HONORS
Prerequisites: PHED 398H and candidacy for honors in Physical Education. Advisement will be on an individual basis. Thesis must be defended in the Honors Seminar.

PHED 400. KINESIOLOGY. (4)
Three lectures and two laboratory hours a week. Prerequisites: ZOOL 101, 201, and 202, or the equivalent. The study of human movement and the physical and physiological principles upon which it depends. Body mechanics, posture, motor efficiency, sports, the performance of atypical individuals, and the influence of growth and development upon motor performance are studied.

PHED 420. PHYSICAL EDUCATION FOR THE ELEMENTARY SCHOOL. (3)
Orientation of the general elementary teacher to physical education. Principles and practices in elementary physical education are discussed and a variety of appropriate activities are considered.

PHED 450. THE PSYCHOLOGY OF SPORTS. (3)
An exploratory of the personality factors, including, but not limited to motivation, aggression, and emotion, as they affect sports participation and motor skill performance.

PHED 455. PHYSICAL FITNESS OF THE INDIVIDUAL. (3)
A study of the major physical fitness problems confronting the adult modern society. Consideration is given to the scientific appraisal, development, and maintenance of fitness at all age levels. Such problems as obesity, weight reduction, chronic fatigue, posture, and special exercise programs are explored. Open to persons outside the professions of physical education.

PHED 460. PHYSIOLOGY OF EXERCISE. (3)
Two lectures and two laboratory hours a week. Prerequisites: ZOOL 101, 201 and 202; PHED 400 or equivalent. A study of the physiology of exercise, including concepts of work, muscular contraction, energy transformation, metabolism, oxygen debt, and nutrition and athletic performance. Emphasis is placed on cardiovascular and respiratory function in relation to physical activity and training.

PHED 480. MEASUREMENT IN PHYSICAL EDUCATION. (3)
Two lectures and two laboratory periods a week. Prerequisite: MATH 105 or 110. A study of the prinicples and techniques of educational measurement as applied to teaching of physical education; study of the functions and techniques of measurement in the evaluation of student progress toward the objectives of physical education and in the evaluation of the effectiveness of teaching.

PHED 485. MOTOR LEARNING AND SKILLED PERFORMANCE. (3)
Prerequisites: PSYC 100 and PHED 480. A study of the research dealing with motor learning and motor performance. Major topics discussed are scientific methodology, individual differences, specificity, proprioceptive control of movement, motivation, timing, transfer, and retention.

PHED 487. PHYSICAL EDUCATION AND SPORT IN CONTEMPORARY CULTURES. (3)
Three lectures a week. Prerequisite: SOCY 100 or equivalent. A study of the cultural impact of physical education activities in the United States and selected countries. Individual research on selected topics is required.

PHED 489. FIELD LABORATORY PROJECTS AND WORKSHOP. (1-6)
Workshops and research projects in special areas of knowledge not covered by regularly structured courses. Note: The maxium total number of credits that may be earned toward any degree in physical education is six.

PHED 490. ORGANIZATION AND ADMINISTRATION OF PHYSICAL EDUCATION. (3)
The application of the principles of administration and supervision to physical education. Students are normally enrolled during the student teaching semester.

PHED 491. THE CURRICULUM IN ELEMENTARY SCHOOL PHYSICAL EDUCATION. (3)
Techniques planning and construction are considered from a standpoint of valid criteria for the selection of content in elementary school physical education. Desirable features of cooperative curriculum planning in providing for learning experiences will be presented and discussed.

PHED 493. HISTORY AND PHILOSOPHY OF SPORT AND PHYSICAL EDUCATION. (3)
History and philosophical implications of sport and physical education through ancient, medieval, and contemporary periods in western civilization.

PHED 495. ORGANIZATION AND ADMINISTRATION OF ELEMENTARY SCHOOL PHYSICAL EDUCATION. (3)
Prerequisite: PHED 420. A study of the procedures basic to the satisfactory organization of all phases of the elementary school physical education program. Emphasis is placed on the organizationanal and administrative factors necessary for the successful operation of the program in various types of elementary schools.

PHED 496. QUANTITATIVE METHODS. (3)
Statistical techniques most frequently used in research pertaining to physical education. Effort is made to provide the student with the necessary skills, and to acquaint him with the interpretations and applications of these techniques.

PHILOSOPHY

PHIL 100. INTRODUCTION TO PHILOSOPHY. (3)
An introduction to some of the main problems of philosophy, and to some of the main ways of dealing with these problems.

PHIL 140. ETHICS. (3)
An introduction to moral philosophy, including a critical examination of some important classic and contemporary systems of ethics, such as those of Aristotle, Kant, Mill, and Dewey.

PHIL 170. ELEMENTARY LOGIC AND SEMANTICS. (3)
An introductory study of logic and language, intended to help the student increase his ability to employ language with understanding and to reason correctly. Topics treated include the use and abuses of language. techniques for making sound inferences and the logic of science.

PHIL 233. PHILOSOPHY IN LITERATURE. (3)
Reading and philosophical criticism of novels and dramas containing ideas significant for ethics, social policy and religion.

PHIL 236. PHILOSOPHY OF RELIGION. (3)
This course seeks to provide the student with the means by which he may approach intelligently the main problems of religious thought: the nature of religious experience, the forms of religious expression, the conflicting claims of religion and science, and the place of religion in the community, and in the life of the individual.

PHIL 250. PHILOSOPHY OF SCIENCE. (3)
An introductory study of the aims, procedures and results of scientific inqulry. Topics discussed include the

formulation and testing of hypotheses, Induction and probability, scientific laws, theories and explanation, concept formation, and relationships among the special sciences.

PHIL 271. SYMBOLIC LOGIC I. (3)
An introduction to the formal analysis of deductive reasoning through formalization of arguments, truth table and natural deduction techniques for propositional logic and quantification theory, including identity and definite descriptions.

PHIL 305. PHILOSOPHY IN AMERICA. (3)
Prerequisite: Six hours in philosophy. A survey of philosophical thought in America from the eighteenth century to the present. Special attention is given to Edwards, Jefferson, Emerson, Royce, Peirce, James, and Dewey.

PHIL 307. ORIENTAL PHILOSOPHY. (3)
Prerequisite: One course in philosophy. Not offered on College Park campus. An examination of the major philosophical systems of the East, attempting to discover the relations between these and important ideas of Western thought.

PHIL 310. ANCIENT PHILOSOPHY. (3)
Prerequisite: Six hours in philosophy. A history of Greek thought from its beginnings to the time of Justinian. The chief figures discussed: The PreSocratic philosophers, Socrates, Plato, Aristotle, Epicurus, the Stoic philosophers, and Plotinus.

PHIL 320. MODERN PHILOSOPHY. (3)
Prerequisite: Six hours in philosophy. A history of philosophical thought in the West during the 16th, 17th, and 18th centuries. The chief figures discussed: Bacon, Galileo, Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume, and Kant.

PHIL 325. 19th CENTURY PHILOSOPHY. (3)
Prerequisite: Six hours in philosophy. A survey of philosophy in the nineteenth century through a consideration of such writers as Hegel, Schopenhauer, Nietzsche, Spencer, Marx, Comte, Mill, Mach, and Bradley.

PHIL 326. 20th CENTURY PHILOSOPHY. (3)
Prerequisite: Six hours in philosophy. A survey of philosophy in the twentieth century through a consideration of representative figures in England, Europe and America. Among the theories to be studied are logical atomism (Russell, Wittgenstein), positivism (Carnap, Ayer), existentialism and phenomenology (Sartre, Husserl), naturalism and realism (Dewey, Santayana).

PHIL 330. PHILOSOPHY OF ART. (3)
An examination of the fundamental concepts in art and in esthetic experience generally. Readings from the works of artists, estheticians, critics and philosophers.

PHIL 343. THE CONFLICT OF IDEALS IN WESTERN CIVILIZATION. (3)
A critical and constructive philosophical examination of the assumptions, goals, and methods of contemporary democracy, fascism, socialism, and communism, with special attention to the ideological conflict between the U.S.A. and the U.S.S.R.

PHIL 360. PHILOSOPHY OF LANGUAGE. (3)
Prerequisite: PHIL 170 or 271. An inquiry into the nature and function of language and other forms of symbolism.

PHIL 388. TOPICAL INVESTIGATIONS. (1-3)
Open to honors students in Philosophy and, by permission of the instructor, to honors students in other departments. Research in selected topics, with group discussion. May be repeated for credit when the topics dealt with are different.

PHIL 389. TOPICAL INVESTIGATIONS. (1-3)
Open to honors students in Philosophy and, by permission of the instructor, to honors students in other departments. Research in selected topics, with group discussion. May be repeated for credit when the topics dealt with are different.

PHIL 399. HONORS SEMINAR. (3)
Open to honors students in Philosophy and, by permission of the Instructor, to honors students in other departments. Research in selected topics, with group discussion. May be repeated for credit when the topics dealt with are different.

PHIL 408. TOPICS IN CONTEMPORARY PHILOSOPHY. (3)
Prerequisite: PHIL 320. An intensive examination of contemporary problems and issues. Source material will be selected from recent books and articles. May be repeated for credit when the topics dealt with are different.

PHIL 412. THE PHILOSOPHY OF PLATO. (3)
Prerequisites: PHIL 310 and 320. A critical study of selected dialogues.

PHIL 414. THE PHILOSOPHY OF ARISTOTLE. (3)
Prerequisites: PHIL 310 and 320. A critical study of selected portions of Aristotle's writings.

PHIL 416. MEDIEVAL PHILOSOPHY. (3)
Prerequisites: PHIL 310 or 320. A history of philosophic thought in the West from the close of the Classical period to the Renaissance. Based on readings of the Stoics, early Christian writers, Neoplatonists, later Christian writers, and Schoolmen.

PHIL 421. THE CONTINENTAL RATIONALISTS. (3)
Prerequisites: PHIL 310 and 320. A critical study of the systems of some of the major 17th and 18th century rationalists, with special reference to Descartes, Spinoza, and Leibniz.

PHIL 422. THE BRITISH EMPIRICISTS. (3)
Prerequisites: PHIL 310 and 320. A critical study of selected writings of Locke, Berkeley, and Hume.

PHIL 423. THE PHILOSOPHY OF KANT. (3)
Prerequisities: PHIL 310 and 320. A critical study of selected portions of Kant's writings.

PHIL 428. TOPICS IN THE HISTORY OF PHILOSOPHY. (3)
Prerequisite: PHIL 310 and 320, or consent of instructor. May be repeated for credit when the topics dealt with are different.

PHIL 440. ETHICAL THEORY. (3)
Prerequisite: PHIL 140. Contemporary problems having to do with the meaning of the principal concepts of ethics and with the nature of moral reasoning.

PHIL 444. POLITICAL AND SOCIAL PHILOSOPHY. (3)
A systematic treatment of the main philosophical issues encountered in the analysis and evaluation of social (especially political) institutions.

PHIL 447. PHILOSOPHY OF LAW. (3)
Prerequisite: One course in philosophy. Examination of fundamental concepts related to law, e.g., legal system, law and morality, justice, legal reasoning, responsibility.

PHIL 455. PHILOSOPHY OF THE SOCIAL SCIENCES. (3)
Prerequisites: Six hours in social science or consent of instructor. A discussion of several of the following topics: the nature of laws and explanation in the social sciences; the relation of the social sciences to mathematics, logic, and the natural sciences; the role of value judgments in the social sciences; the relation of social science to social policy; problems of methodology.

PHIL 457. PHILOSOPHY OF HISTORY. (3)
An examination of the nature of historical knowledge and historical explanation, and of theories of the meaning of world history.

PHIL 458. TOPICS IN THE PHILOSOPHY OF SCIENCE. (3)
Prerequisite: PHIL 250 or consent of instructor. Detailed examination of some basic issues in the methodology and conceptual structure of scientific inquiry. To be investigated are such topics as confirmation theory, structure and function of scientific theories, scientific explanation, concept formation, and theoretical reduction.

PHIL 461. THEORY OF MEANING. (3)
Prerequisites: PHIL 170 or 271, and 320. A study of theories about the meaning of linguistic expressions,

including the verification theory and the theory of meaning as use. Among topics to be considered are naming, referring, synonymy, intension and extension, and ontological commitment. Such writers as Mill, Frege, Russell, Lewis, Carnap, Wittgenstein, Austin, and Quine will be discussed.

PHIL 462. THEORY OF KNOWLEDGE. (3)
Prerequisites: PHIL 310 and 320. PHIL 271 recommended. The origin, nature, and validity of knowledge will be considered in terms of some philosophic problems about perceiving and thinking, knowledge and belief, thought and language, truth and confirmation.

PHIL 464. METAPHYSICS. (3)
Prerequisites: PHIL 310 and 320. PHIL 271 recommended. A study of some central metaphysical concepts (such as substance, relation, causality, and time) and of the nature of metaphysical thinking.

PHIL 466. PHILOSOPHY OF MIND. (3)
Prerequisite: PHIL 320. An inquiry into the nature of mind through the analysis of such concepts as consciousness, perception, understanding, imagination, emotion, invention, and action.

PHIL 471. SYMBOLIC LOGIC II. (3)
Prerequisite: PHIL 271 or consent of instructor. Axiomatic development of the propositional calculus and the first-order functional calculus, including the deduction theorem, independence of axioms, consistency, and completeness.

PHIL 474. INDUCTION AND PROBABILITY. (3)
Prerequisite: Consent of instructor. A study of inferential forms, with emphasis on the logical structure underlying such inductive procedures as estimating and hypothesis-testing. Decision-theoretic rules relating to induction will be considered, as well as classic theories of probability and induction.

PHIL 478. TOPICS IN SYMBOLIC LOGIC. (3)
Prerequisite: PHIL 471. May be repeated for credit when the topics dealt with are different.

PHIL 498. TOPICAL INVESTIGATIONS. (1-3)

PHIL 499. TOPICAL INVESTIGATIONS. (1-3)

PHYSICS

PHYS 111. PHYSICS IN THE MODERN WORLD. (3)
The first semester of a survey course in general physics emphasizing the role that physics plays in science, technology, and society today. The course is concept oriented and minimal use of mathematics is made. Intended for the general student; does not satisfy the requirements of the professional schools.

PHYS 112. PHYSICS IN THE MODERN WORLD. (3)
The second semester of a survey course in general physics emphasizing the role that physics plays in science, technology, and society today. The course is concept oriented and minimal use of mathematics is made. Intended for the general student; does not satisfy the requirements of the professional schools.

PHYS 114. ENERGY AND THE ATMOSPHERE. (4)
One semester, 4 credits. A physical science course for students who wish an acquaintance with the methods and attitudes of physical science and their application to today's problems of the environment. Includes topics such as energy, sources and resources, the atmosphere, and man's interaction with it. Appropriate for non-science students.

PHYS 117. INTRODUCTION TO PHYSICS. (4)
Three lectures and one two-hour laboratory per week. Prerequisite: Qualification to enter MATH 110. Intended for students majoring in neither the physical nor biological sciences. A study of the development of some of the basic ideas of physical science.

PHYS 121. FUNDAMENTALS OF PHYSICS I. (4)
Three lectures, one recitation, and one two-hour laboratory period a week. Prerequisite: Entrance credit in trigonometry or MATH 111 or concurrent enrollment in MATH 115. The first part of a two-semester course in general physics treating the fields of mechanics, heat, sound, electricity, magnetism, optics, and modern physics, together with PHYS 122. This generally satisfies the minimum requirements of medical and dental schools.

PHYS 122. FUNDAMENTALS OF PHYSICS II. (4)
Three lectures, one recitation, and one two-hour laboratory period per week. Prerequisite: PHYS 121 or equivalent. A continuation of PHYS 121, which, together with it, generally satisfies the minimum requirement of medical and dental schools.

PHYS 141. PRINCIPLES OF PHYSICS. (4)
The first of a two-semester series in general physics. Three lectures, one recitation, and one two-hour laboratory per week. Concurrent enrollment in MATH 141 or equivalent. The first semester covers the fields of mechanics, thermodynamics, and special relativity. This survey course will use calculus and is recommended for chemistry and zoology majors. It also satisfies the requirements of medical and dental schools.

PHYS 142. PRINCIPLES OF PHYSICS. (4)
A continuation of PHYS 141. The second semester covers the fields of waves, electricity and magnetism, optics, and modern physics.

PHYS 161. GENERAL PHYSICS—MECHANICS AND PARTICLE DYNAMICS. (3)
Three lectures and one recitation per week. MATH 141 prerequisite or concurrent registration. The first semester of a three-semester calculus-based general physics course: (See PHYS 262 and 263). Laws of motion, force, end energy; principles of mechanics; collisions; harmonic rotation; and gravitation.

PHYS 181. INTRODUCTORY PHYSICS—MECHANICS, FLUIDS, HEAT, AND SOUND. (4)
Five lecture-demonstration-recitation periods per week. Prerequisites: High school physics course; MATH 140 or concurrent enrollment in MATH 140 with a score of 650 or more on SAT Mathematics Test; or consent of the department. The first part of a four-semester sequence (PHYS 181, 182, 283, 284) giving a broad detailed introduction to physics intended primarily for physics majors and other students desiring more rigorous preparation in the physical sciences.

PHYS 182. INTRODUCTORY PHYSICS—MECHANICS, FLUIDS, HEAT, AND SOUND. (4)
Five lecture-demonstration-recitation periods per week. Prerequisite: PHYS 181 or equivalent and concurrent enrollment in MATH 141. The second part of a four-semester sequence of courses (PHYS 181, 182, 283, 284).

PHYS 221. GENERAL PHYSICS FOR SCIENCE TEACHERS I. (5)
Three lectures and two two-hour labs per week. Prerequisites: High school physics or a non-calculus college physics survey course, and co-requisite: MATH 141. The first part of a two-semester course in physics stressing physical insight, for prospective secondary school science teachers.

PHYS 222. GENERAL PHYSICS FOR SCIENCE TEACHERS II. (5)
Three lectures and two two-hour labs per week Prerequisite: PHYS 221 or equivalent. The second part of a two-semester sequence, continuing PHYS 221.

PHYS 262. GENERAL PHYSICS—HEAT, ELECTRICITY AND MAGNETISM. (4)
Three lectures, one recitation, and one three-hour laboratory per week. Prerequisite: PHYS 161. The second semester of a calculus-based general physics course. Thermodynamics; kinetic theory; electrostatics; electrodynamics; Maxwell's equations.

PHYS 263. GENERAL PHYSICS—WAVES, RELATIVITY AND QUANTUM PHYSICS. (4)
Three lectures, one recitation, and one three-hour laboratory per week. Prerequisite: PHYS 262. The third

semester of a calculus-based general physics course. Wave motion; electro-magnetic waves; refraction; interference and diffraction; special theory of relativity; quantum physics.

PHYS 271. INTERMEDIATE MECHANICS. (3)
Prerequisites: PHYS 121, 122; MATH 141 previously or concurrently. Three lecture-hours per week. Intended for students having completed PHYS 122 and wishing to enter the physical sciences major program. Not intended as a main-line course for physics majors. (Students offering transfer credit equivalence of PHYS 121, 122 who wish to become physics majors would start the sequence beginning with PHYS 181.)

PHYS 283. INTRODUCTORY PHYSICS—ELECTRICITY AND MAGNETISM. (4)
Three lectures and two demonstration periods a week. Prerequisites: PHYS 181, 182, pre- or corequisite, MATH 141. The third quarter of a broad, detailed introduction to physics; intended primarily for physics majors and other students with superior backgrounds in mathematics and the sciences.

PHYS 284. INTRODUCTORY PHYSICS—OPTICS AND MODERN PHYSICS. (4)
Prerequisites: PHYS 283 and previous or concurrent enrollment in MATH 240, or consent of instructor. The last quarter of a broad, detailed introduction to physics, intended primarily for physics majors and other students with superior backgrounds in mathematics and the sciences.

PHYS 285. INTERMEDIATE PHYSICS EXPERIMENTS I. (2)
Four hours of laboratory work per week. Prerequisite: Concurrent enrollment in PHYS 283 or PHYS 284. Selected experiments.

PHYS 286. INTERMEDIATE PHYSICS EXPERIMENTS II. (2)
Four hours of laboratory work per week. Prerequisite: PHYS 142 or concurrent enrollment in PHYS 283 or PHYS 284. Selected experiments.

PHYS 299. SPECIAL PROBLEMS IN PHYSICS. (1-6)
Prerequisite: Consent of department. Research or special study to complement courses taken elsewhere which are not fully equivalent to those in departmental requirements. Credit according to work done. May be taken no more than twice. Maximum of eight credits applicable to B.S. degree program.

PHYS 305. PHYSICS SHOP TECHNIQUES. (1)
One three hour laboratory per week. Prerequisite: PHYS 365 or consent of instructor. Machine tools, design and construction of laboratory equipment.

PHYS 318. TOPICS IN CONTEMPORARY PHYSICS. (3)
Prerequisite: PHYS 122, PHYS 112 or consent of the instructor. A survey of topics of current research and public interest. Intended for the non-physics or non-science major. Topics covered will include lasers, quantum liquids, cosmology, elementary particles and geophysics.

PHYS 321. INTERMEDIATE ELECTRICITY AND MAGNETISM. (3)
Prerequisite: PHYS 121, 122; MATH 240 previously or concurrently; PHYS 271 or permission of the instructor. Electrostatics, direct current and alternating current circuitry, electromagnetic effects of steady currents, electromagnetic induction, development of Maxwell's equations.

PHYS 365. ADVANCED EXPERIMENTS. (2)
Four hours of laboratory work per week. Prerequisite: PHYS 284 and 286 or 263. Selected fundamental experiments in electricity and magnetism, elementary electronics, and optics.

PHYS 389. UNDERGRADUATE THESIS RESEARCH. (1-6)
Prerequisite: Consent of advisor. Independent directed research and study on a topic selected by the student in consultation with his advisor. Final written thesis and oral defense will be expected. Enrollment limited to undergraduate physics majors. May be repeated to a maximum of six credits.

PHYS 398. INDEPENDENT STUDIES SEMINAR. (1-16)
Credit according to work done. Enrollment is limited to students admitted to the independent studies program in physics.

PHYS 399. SPECIAL PROBLEMS IN PHYSICS. (1-3)
Two hours laboratory work a week for each credit hour. One to three credits may be taken concurrently each semester. (Will be given with sufficient demand.) Prerequisite: PHYS 365 and consent of advisor. Selected advanced experiments.

PHYS 400. BASIC CONCEPTS OF PHYSICS I. (3)
Prerequisite. Junior standing. A primarily descriptive course in two semesters, intended mainly for those students in the liberal arts who have not had any other course in physics. This course does not serve as a prerequisite or substitute for other physics courses. The main emphasis is on the concepts of physics, their evolution and their relation to other branches of human endeavor.

PHYS 401. BASIC CONCEPTS OF PHYSICS II. (3)
Prerequisite: PHYS 400 or consent of instructor.

PHYS 404. INTERMEDIATE THEORETICAL MECHANICS. (3)
Prerequisite: PHYS 271 and 321, or PHYS 284 or PHYS 263; MATH 241 previously or concurrently. Fundamentals and selected advanced topics of physical mechanics. Vector differential calculus will be used. For students starting physics without calculus, this course serves as part of the series of PHYS 271, 321, 404, 405, to provide terminal courses in general physics for physical science majors.

PHYS 405. INTERMEDIATE THEORETICAL ELECTRICITY AND MAGNETISM. (3)
Prerequisite: PHYS 284 or 321 or 263; MATH 241. After MATH 241 this course may be taken concurrently with PHYS 404. Intermediate electricity and magnetism and electromagnetic waves (optics). Vector differential calculus is used throughout.

PHYS 406. OPTICS. (3)
Three lectures a week. Prerequisites: PHYS 122, 142 or 263 and MATH 240. Geometrical optics, optical instruments, wave motion, interference and diffraction, and other phenomena in physical optics.

PHYS 407. SOUND. (3)
(Will be given only with sufficient demand.) Three lectures a week. Prerequisites: PHYS 122, 142 or 263. MATH 240 is to be taken concurrently.

PHYS 410. ELEMENTS OF THEORETICAL PHYSICS—MECHANICS. (4)
Prerequisites: PHYS 263, 284, 404 and 405; also MATH 241; or consent of instructor. A study of the theoretical foundations of mechanics, with extensive application of the methods. Also various mathematical tools of theoretical physics.

PHYS 411. ELEMENTS OF THEORETICAL PHYSICS—ELECTRICITY AND MAGNETISM. (4)
Prerequisite: PHYS 410 or consent of instructor. A study of the foundations of electromagnetic theory, with extensive application of the methods. Thorough treatment of wave properties of solutions of Maxwell's Equations.

PHYS 412. KINETIC THEORY OF GASES. (3)
Prerequisites: PHYS 404 and 405 or PHYS 410 and MATH 240 or equivalent. Dynamics of gas particles, Maxwell-Boltzmann distribution, diffusion, Brownian motion, etc.

PHYS 414. INTRODUCTION TO THERMODYNAMICS AND STATISTICAL MECHANICS. (3)
Three lectures a week. Prerequisites: MATH 240, PHYS 284 or 404 or consent of the instructor. Introduction of

basic concepts in thermodynamics and statistical mechanics.

PHYS 420. MODERN PHYSICS FOR ENGINEERS. (3)
Three lectures per week. Prerequisites: PHYS 263 or 284 or 404 and 405; MATH 241 or consent of instructor. A survey of atomic and nuclear phenomena and the main trends in modern physics. This course is appropriate for students in engineering and other physical sciences. It should not be taken in addition to PHYS 421.

PHYS 421. INTRODUCTION TO MODERN PHYSICS. (3)
Three lectures a week. Prerequisites PHYS 284 or equivalent; MATH 241 including some knowledge of ordinary differential equations. Introductory discussion of special relativity, origin of quantum theory, Bohr atom, wave mechanics, atomic structure, and optical spectra.

PHYS 422. MODERN PHYSICS. (3)
Three lectures a week. Prerequisite: PHYS 421. This course uses the basic ideas of quantum mechanics and special relativity to discuss the characteristics of many diverse subjects including complex atoms, molecules, solids, nuclei and elementary particles.

PHYS 423. ELEMENTARY QUANTUM PHYSICS. (3)
Prerequisites: PHYS 420 or PHYS 421; MATH 246; and a level of mathematical sophistication equivalent to that of a student who has taken PHYS 410 and PHYS 411, or ENEE 380 and ENEE 382. The quantum theory is presented in a rigorous way including the concepts of operators, measurement and angular momentum. These concepts together with the Schroedinger Equation are then applied to some basic problems in atomic and molecular physics.

PHYS 429. ATOMIC AND NUCLEAR PHYSICS LABORATORY. (3)
Credits of PHYS 365 and consent of instructor. Classical experiments in atomic physics and more sophisticated experiments in current techniques in nuclear physics.

PHYS 431. PROPERTIES OF MATTER. (3)
Three lectures a week. Prerequisites: PHYS 404 and 405 or 410, 420, 421. Introduction to solid state physics. Electro-magnetic, thermal, and elastic properties of metals, semiconductors and insulators.

PHYS 441. NUCLEAR PHYSICS. (3)
Four lectures a week. Prerequisites: PHYS 404 and 405 or 410, 420 or 421. An introduction to nuclear physics at the pre-quantum-mechanics level. Properties of nuclei; radioactivity; nuclear systematics; nuclear moments; the shell model, interaction of charged particles and gamma rays with matter; nuclear detector; accelerators: nuclear reactions; beta decay; high energy phenomena.

PHYS 443. NEUTRON REACTOR PHYSICS. (3)
Prerequisite: PHYS 371 or 421 or consent of instructor. Various related topics in neutron reactor physics.

PHYS 451. INTRODUCTION TO ELEMENTARY PARTICLES. (3)
Three lectures per week. Prerequisite: PHYS 422 or consent of instructor. Properties of elementary particles, production and detection of particles, relativistic kinematics, invariance principles and conservation laws.

PHYS 461. INTRODUCTION TO FLUID DYNAMICS. (3)
Three lectures a week. Prerequisites: PHYS 404 and MATH 240. Kinematics of fluid flow, properties of incompressible fluids, complex variable methods of analysis, wave motions.

PHYS 463. INTRODUCTION TO PLASMA PHYSICS. (3)
Three lectures a week. Prerequisites: PHYS 404 and 405 or 410, 421 or 420. Orbit theory, magnetohydrodynamics, plasma heating and stability, waves and transport processes.

PHYS 465. MODERN OPTICS. (3)
Prerequisite: PHYS 284, 263 or 406; and PHYS 420 or 421; and PHYS 410 or mathematical preparation including Fourier analysis; or consent of the instructor. Intended for students with a background in fundamental optics, this course deals with topics in modern optics at an advanced undergraduate level and is also suited to graduate studies.

PHYS 471. INTRODUCTION TO ATMOSPHERIC AND SPACE PHYSICS. (3)
Three lectures a week. Prerequisite: PHYS 404 and 405 or 410, 420 or 421. Motions of charged particles in magnetic fields, aspects of plasma physics related to cosmic rays and radiation belts, atomic phenomena in the atmosphere, thermodynamics and dynamics of the atmosphere.

PHYS 483. INTRODUCTION TO BIOPHYSICS. (2)
Prerequisite: Intermediate physics and MATH 240.

PHYS 485. ELECTRONIC CIRCUITS. (4)
Three hours of lecture and two of laboratory per week. Prerequisite: PHYS 365 and concurrent enrollment in PHYS 405 or PHYS 411. Theory of semi-conductor and vacuum tube circuits. Application in experimental physics.

PHYS 487. PARTICLE ACCELERATORS, PHYSICAL AND ENGINEERING PRINCIPLES. (3)
Three hours of lecture per week. Prerequisites: PHYS 410, 411 or PHYS 271, 321 and PHYS 421, or equivalents. Sources of charged particles, methods of acceleration and focusing of electron and ion beams in electromagnetic fields; electrostatic accelerators; constant-gradient cyclotrons and synchrotrons; betatrons and microtrons; the alternating-gradient and sector-focusing principles; isochronous cyclotrons and alternating-gradient synchrotrons: linear accelerators. This course is also listed as ENEE 487.

PHYS 499. SPECIAL PROBLEMS IN PHYSICS. (1-16)
Prerequisite, major in physics and consent of advisor. Research or special study. Credit according to work done.

PORTUGUESE

PORT 101. ELEMENTARY PORTUGUESE. (4)
Introduction to basic structures, with emphasis upon audio-lingual skills. Four recitations per week and one optional laboratory hour. Leads to 102.

PORT 102. ELEMENTARY PORTUGUESE. (4)
Completion of basic structures with increasing emphasis upon reading skill, reinforced by discussion and composition. Four recitations per week and one optional laboratory hour.

PORT 104. INTERMEDIATE PORTUGUESE. (4)
Extensive reading, discussion and composition. Four recitations per week and one optional laboratory hour.

PSYCHOLOGY

PSYC 100. INTRODUCTION TO PSYCHOLOGY. (3)
A basic introductory course, intended to bring the student into contact with the major problems confronting psychology and the more important attempts at their solution.
H—HONORS

PSYC 200. STATISTICAL METHODS IN PSYCHOLOGY. (3)
Prerequisite: PSYC 100 and MATH 110, 115, or equivalent. A basic introduction to quantitative methods used in psychological research.

PSYC 201. INTERMEDIATE PSYCHOLOGY (HONORS). (3)
H—HONORS
Usually taken during sophomore year. Prerequisite: PSYC 100H or permission of instructor. The course content will stress the interrelations among data derived from the fields of human development, cognition, perception, measurement and social processes.

PSYC 206. DEVELOPMENTAL PSYCHOLOGY. (3)
Prerequisite: PSYC 100. Biological basis of behavioral development in relation to genetic, constitutional, anatomical, physiological, and environmental factors. Emphasis upon both phylogenetic and ontogenetic research findings in biological psychology.

PSYC 221. SOCIAL PSYCHOLOGY. (3)
Prerequisite: PSYC 100. Personality and behavior as influenced by culture and interpersonal relations. Social influences on motivation, learning, memory, and perception. Attitudes, public opinion, propaganda, language and communication, leadership, ethnic differences, and group process.

PSYC 301. BIOLOGICAL BASIS OF BEHAVIOR. (3)
Prerequisite: PSYC 200, or 8 hours of zoology, or consent of instructor. This course is intended primarily for science majors or psychology majors not planning to take PSYC 400. May not be taken concurrently with or after PSYC 400. Surveys the experimental analysis of the behavior of humans and animals from the point of view of the biological mechanisms of behavior. Considers such topics as genetic determiners and physiological mechanisms, and basic principles of conditioning and learning.

PSYC 331. INTRODUCTION TO ABNORMAL PSYCHOLOGY. (3)
Prerequisite: PSYC 100. History of the study of psychopathology and mental health; concepts of models of psychopathology; concepts and models of positive mental health; major syndromes of deviant behavior, including psychoneurosis, psychosis, personality disorders, and effective disorders; theories of deviant behavior; and community mental health.

PSYC 333. CHILD PSYCHOLOGY. (3)
Prerequisite: PSYC 100. Behavioral analysis of normal development and normal socialization of the growing child. A student may not receive credit for both PSYC 333 and 433.

PSYC 335. PERSONALITY AND ADJUSTMENT. (3)
Prerequisite: PSYC 100. Introduction to psychology of human personality and adjustment. This course is designed for the student who desires a general knowledge of this area of psychology. A student may not receive credit for both PSYC 335 and 435.

PSYC 337. INTRODUCTION TO COMMUNITY PSYCHOLOGY. (3)
Prerequisites: PSYC 100, 200, 221, 335 or 435, senior standing. This course offers a survey and critical examination of some of the environmental factors which are associated with variations in an individual's personal functioning. The course is designed to acquaint the student with the effects of social processes and social structure in community life on the adequacy of an individual's psychological well-being. In particular, the relationships among social structures and the parameters of an individual's mental health are examined for cocultural groups in our society which are at high risk for psychological dysfunction. Reading on a broad range of topics in community psychology, direct observation of selected community programs, and a formal seminar presentation are required of students in the course.

PSYC 361. SURVEY OF INDUSTRIAL PSYCHOLOGY. (3)
Prerequisite: PSYC 100. A course for nonmajors which provides a general survey of the field of industrial psychology, including such topics as selection, training, job satisfaction, social organization, and environmental factors. A student may not receive credit for both PSYC 361 and 461.

PSYC 400. EXPERIMENTAL PSYCHOLOGY—LEARNING MOTIVATION. (4)
Two lectures and four one-hour laboratory periods per week. Prerequisite: PSYC 200 or equivalent. Students who have taken PSYC 301 need consent of instructor. Primarily for students who major in psychology. The experimental analysis of behavior with emphasis on conditioning, learning and motivational processes. Experiments are conducted on the behavior of animals.

PSYC 402. PHYSIOLOGICAL PSYCHOLOGY. (3)
Prerequisite: PSYC 410 or consent of instructor. An introduction to research on the physiological basis of human behavior, including considerations of sensory phenomena, motor coordination, emotion, drives, and the neurological basis of learning.

PSYC 403. ANIMAL BEHAVIOR. (3)
Prerequisite: PSYC 400 or consent of instructor. A study of animal behavior, including considerations of social interactions, learning, sensory processes, motivation, and experimental methods, with a major emphasis on mammals.

PSYC 410. EXPERIMENTAL PSYCHOLOGY—SENSORY PROCESSES I. (4)
Three lectures and one two-hour laboratory/demonstration period per week. Prerequisite: PSYC 200 or equivalent. Primarily for students who major in psychology. A systematic survey of the content, models, and methodologies of sensory and perceptual research.

PYC 412. EXPERIMENTAL PSYCHOLOGY—SENSORY PROCESSES II. (4)
Two lectures and four hours of laboratory exercise and research per week. Prerequisite: PSYC 410 or consent of instructor. Primarily for psychology majors and majors in biological sciences with a special interest in sensory processes. Lectures and laboratory exercises will emphasize contemporary problems in sensory process research. Sufficient latitude will be provided so the exceptional student may conduct original research based on findings reported in the current literature.

PSYC 420. EXPERIMENTAL PSYCHOLOGY— SOCIAL BEHAVIOR. (4)
Two lectures and two two-hour laboratory periods per week. Prerequisite: PSYC 221 and PSYC 200 or equivalent. A laboratory course dealing with methods of studying behavior in the social context. Topics will include social perception and motivation, small groups, communication and persuasion. Consideration will be given to the techniques involved in laboratory experimentation, field studies, attitude scale construction, and opinion surveys.

PSYC 422. LANGUAGE AND SOCIAL COMMUNICATION. (3)
Prerequisite: PSYC 221 and PSYC 200 or equivalent, and consent of instructor. The nature and significance of verbal and nonverbal communication in social psychological processes including examination of relevant theoretical approaches to symbolic behavior.

PSYC 423. ADVANCED SOCIAL PSYCHOLOGY. (3)
Prerequisite: PSYC 420. A systematic review of research and points of view in regard to major problems in the field of social psychology.

PSYC 431. ABNORMAL PSYCHOLOGY. (3)
Prerequisite: PSYC 100 and 200 or equivalent. The nature, diagnosis, etiology, and treatment of mental disorders. A student may not receive credit for both PSYC 331 and 431.

PSYC 433. ADVANCED TOPICS IN CHILD PSYCHOLOGY. (3)
Prerequisite: PSYC 200 or equivalent. The growth and transformation of basic psychological processes from birth to maturity. Emphasis is on research data and methodological issues, especially as they relate to other aspects of psychology. A student may not receive credit for both PSYC 333 and 433.

PSYC 435. PERSONALITY. (3)
Prerequisite: PSYC 200 or equivalent. Major personality theories, their postulates and evidence; assessment and research methodology in personality; major areas of personality research, their methodologies, findings, implications, and relationships to the field of psychology. A student may not receive credit for both PSYC 335 and 435.

PSYC 436. INTRODUCTION TO CLINICAL PSYCHOLOGY. (3)
Prerequisites: PSYC 100, 200, 335 or 435, 431, senior standing. Pysch. majors only. The course offers a survey and critical analysis of clinical psychology, with particular emphasis on current developments and trends. The course is designed to broaden the student's perspective on clinical psychology, to increase his intrinsic interest in the field, and to provide him with a firmer basis for critical evaluation of major theoretical and methodological foundations in the field. Students will be expected to conduct individual projects related to the course with a substantial amount of direct supervision.

PSYC 441. PSYCHOLOGY OF HUMAN LEARNING. (3)
Prerequisite: PSYC 200 or equivalent. Review and analysis of the major phenomena and theories of human learning, including an introduction to the fields of problem solving, thinking and reasoning.

PSYC 451. PRINCIPLES OF PSYCHOLOGICAL TESTING. (4)
Three lectures and one two-hour laboratory period per week. Prerequisite: PSYC 200 or equivalent. A survey of the basic concepts and theories of psychological measurement illustrated through demonstration of principal approaches to psychological testing.

PSYC 452. PSYCHOLOGY OF INDIVIDUAL DIFFERENCES. (3)
Prerequisite: PSYC 451. Problems theories, and researches related to psychological differences among individuals and groups.

PSYC 453. MATHEMATICAL PSYCHOLOGY. (3)
Prerequisite: PSYC 200 or equivalent, and consent of instructor. A survey of mathematical formulations in psychology, including measurement and scaling models, statistical and psychometric models, and elementary mathematical representations of psychological processes in learning, choice, psychophysics, and social behavior.

PSYC 461. PERSONNEL AND ORGANIZATIONAL PSYCHOLOGY. (3)
Prerequisite: PSYC 200 or equivalent, and one other 200 level course. For majors. Intensive examination of issues in personnel psychology (recruitment, selection and classification, job satisfaction) and organization psychology (motivation, morale, group processes including leadership, organization theory). Emphasis is on theories of behavior in organizations and research results regarding behavior in on-going human systems. Where appropriate, relations between theory and practice are discussed.

PSYC 462. ENGINEERING PSYCHOLOGY AND TRAINING MODELS. (3)
Prerequisite: PSYC 200 or equivalent, and one other 200 level course. For majors. An examination of the theories and research regarding human performance capabilities and skills (information processing, decision-making, environmental constraints, automation), training procedures (traditional methods, programmed learning, computer-assisted instruction) and models and procedures for evaluating training programs in industry education, and service organizations.

PSYC 467. VOCATIONAL PSYCHOLOGY. (3)
Survey and critical analysis of theory and research on vocational choice and vocational adjustment. Definition and correlates of vocational aspirations, preferences, choices, motivation, success, and satisfaction. Developmental trends in career decision-making and career patterns.

PSYC 478. INDEPENDENT STUDY IN PSYCHOLOGY. (1-3)
Prerequisite: Written consent of instructor. A student who wishes to take independent work must have completed 12 hours of psychology with at least a 2.5 average. Integrated reading under direction leading to the preparation of an adequately documented report on a special topic. (In special cases a student who may need to repeat this course in order to complete his independent study will make a formal request, including a research proposal, through his advisor to the Departmental Honors Committee.)

PSYC 479. SPECIAL RESEARCH PROBLEMS IN PSYCHOLOGY. (1-3)
Prerequisite: Written consent of instructor. A student who wishes to take independent research study must have completed 12 hours of psychology with at least a 2.5 average. An individual course designed to allow the student to pursue a specialized research topic under supervision. (In special cases a student who may need to repeat this course in order to complete his research will make a formal request, including a research proposal, through his advisor to the Departmental Honors Committee.)

PSYC 488. ADVANCED PSYCHOLOGY I (HONORS). (3)
H—HONORS
Uusually taken during junior year. Prerequisites: PSYC 200 and permission of Department Honors Committee. Seminar covering topics in sensation, perception, learning, and motivation.

PSYC 489. SENIOR SEMINAR. (3)

PSYC 498. ADVANCED PSYCHOLOGY II (HONORS). (3)
H—HONORS
Usually taken during senior year. Prerequisite: PSYC 488H. Seminar covering topics in measurement, social processes and other subject matter of current interest.

PSYC 499. HONORS THESIS RESEARCH. (3)
H—HONORS
Usually taken during last semester in residence. Prerequisite: Permission of thesis advisor.

RADIO AND TELEVISION

RATV 124. MASS COMMUNICATION IN 20th CENTURY SOCIETY. (3)
A problem centered approach to the study of mass communication and the impact of media on contemporary society. Each semester the media treatment of a contemporary social, economic or environmental issue is used as a focus for study of the principles, techniques and effects of mass media. Students produce simple radio, television and film material on the selected issue.

RATV 222. INTRODUCTION TO RADIO AND TELEVISION. (3)
A survey of the development, scope and influence of radio and television in America, with emphasis on the relationship of the industry to the audience, the advertiser, and the government.

RATV 223. THE TELEVISION PROGRAM: PLANNING AND MANAGEMENT. (3)
Prerequisite: RATV 222. Study of basic program formats and variations with special emphasis on pre-production planning, production organization, management, facility utilization and cost analysis.

RATV UPPER-LEVEL COURSE PREREQUISITES:
RATV 222 and 223 are prerequisites for all majors prior to enrollment in upper level courses. Non-majors are requested to obtain instructor's consent for all upper level courses. All students are limited to one production course per semester unless permission is obtained prior to registration.

RATV 302. RADIO PRODUCTION. (3)
A study of the multiple problems facing the producer, including scripting, casting, acoustic planning, recording, editing and coordination or personnel. Some emphasis is given to the use of audio in media other than radio.

RATV 317. RADIO AND TELEVISION CONTINUITY WRITING. (3)
Prerequisite: Consent of instructor. A study of the principles, methods and limitations of writing for radio

and television. Application will be made in the writing of general types of continuities and commercials.

RATV 332. PUBLIC BROADCASTING. (3)
Public television and radio: development; problems; influence; its place in contemporary broadcasting, through the viewing of and listening to selected programs.

RATV 340. PRINCIPLES OF TELEVISION PRODUCTION. (3)
A study of the theory, methods, techniques and problems of television production. Units of study covering the television camera and lenses, lighting theory and practices, audio, graphic arts, film basics and special effects are included. Practical application of production theory is provided in television studios.

RATV 346. TELEVISION NEWS AND PUBLIC AFFAIRS. (3)
Prerequisite: RATV 317 or JOUR 360. A survey of the development of broadcast journalism, current problems concerning radio and television news, and the development of the documentary. Observation of news operations at nearby television stations are provided. Production exercises in television news presentation, interviews and discussions are conducted in television studios.

RATV 347. ANALYSIS OF BROADCASTING PROCESSES AND RESULTS. (3)
Survey of the more common analytic approaches, methods, and results in field of radio and television.

RATV 351. BROADCAST PROGRAMMING. (3)
An introduction to the history, types, theories, and conventions of American radio and television programming.

RATV 355. FILM PRODUCTION. (3)
Prerequisite: Consent of instructor. A study of the theoretical and practical aspects of 16 mm film production. Through reading and practice, students are familiarized with basic cinematography, lighting, editing, pictorial composition, and film continuity as a communication arts medium.

RATV 411. SEMINAR. (3)
Prerequisites: Senior standing and consent of instructor. Present day radio-television-film research.

RATV 414. CONTEMPORARY AMERICAN CINEMA. (3)
Culture as they are expressed through the film medium. Emphasis on 'new wave', experimental, underground, independent, and cinema verite motion pictures.

RATV 415. CONTEMPORARY EUROPEAN CINEMA. (3)
A comparative and critical analysis of the European motion picture both as a distinct art form reflecting the national character of a particular country and as a medium for mass communications demonstrating the universality of the human condition.

RATV 417. DRAMATIC WRITING FOR BROADCASTING AND FILM. (3)
Prerequisite: RATV 317 or consent of instructor. An introduction to the principles, methods and limitations of writing comedy, drama, and the documentary for radio, television, and film.

RATV 420. THE DOCUMENTARY FILM. (3)
Growth, implication, and the use of the international nonfiction film as propaganda, public service, promotion, education and entertainment. Case studies from representative documentaries will be analyzed.

RATV 425. TELEVISION AND POLITICS. (3)
Critical review of studies of the effects of political broadcasts; legal and social issues; surveys and media campaigns.

RATV 440. TELEVISION DIRECTION. (3)
Two-hour lecture, three-hour laboratory. Prerequisite: RATV 340. Principles of television direction, including analysis of script, casting, rehearsing, production, and video control.

RATV 449. TELEVISION WORKSHOP. (3)
Two-hour lecture, four-hour laboratory. Prerequisites: RATV 340, 440 and consent of instructor.

RATV 450. RADIO AND TELEVISION STATION MANAGEMENT. (3)
The role of the manager in the modern broadcasting industry. Station communication factors, regulation, licensing, personnel functions, sales, programming supervision, audience analysis, and station promotion.

RATV 451. BROADCAST CRITICISM. (3)
An analysis of the professional, historical, social, and psychological criticism of American radio and television, together with practical application of professional and scholarly critical methods.

RATV 452. INTERNATIONAL AND COMPARATIVE BROADCASTING SYSTEMS. (3)
A comparative study of international broadcasting program policies, economic systems, control and organization. The use of broadcasting in international affairs as an instrument of propaganda, culture and information dissemination. Monitoring of overseas broadcasts, television programs and discussions with representatives of domestic and foreign international broadcast agencies.

RATV 453. BROADCASTING AND GOVERNMENT. (3)
Legal issues involving radio and television: freedom, restraints, self-regulation; regulation of programming; competition, rights as seen by the broadcaster, regulatory agencies and the public.

RATV 465. ADVANCED FILM PRODUCTION. (3)
Prerequisites: RATV 355 and consent of instructor. Consideration of film technique and theory as they apply to the making of a full length motion picture.

RECREATION

RECR 130. HISTORY AND INTRODUCTION TO RECREATION. (2)
An introduction to the beginnings, growth, and possibilities in recreation as presently conducted by individuals, agencies and governments; attitudes toward and theories of play; historical events and figures; organizations and groups interested in recreation, including job opportunities, specifications and demands; a self analysis of individual student interests, limitations and capabilities in light of these specifications and demands.

RECR 150. CAMP COUNSELING. (2)
A study of the philosophy and techniques of camp counseling including the qualifications, responsibilities and skills involved; the basic organization, administration and program planning practices and problems of camping as a whole; the relationship of these practices and problems to the prospective counselor. Outdoor skills will be taught and practiced insofar as possible with field trips included.

RECR 220. CO-RECREATIONAL GAMES AND PROGRAMS. (2)
Compilation and sampling of the techniques for use in low organization and party games and activities. Emphasis is placed upon those activities of value to a recreation leader or teacher, and upon the placement, sequence and variation of such activities for all age levels and interests.

RECR 221. NATURE LORE. (2)
An overall orientation course in nature interpretation covering, from a recreational point of view, the various areas of the physical and biological sciences. Students will be required to carry out various observations and participate in practice-leadership experiences as scheduled.

RECR 325. GENERAL FUNDAMENTALS OF RECREATION. (3)
This course is designed for and limited to students not majoring in recreation who wish to develop some understanding of the place, importance and potentialities of recreation in modern life. Included will be limited study of the areas of philosophy, program planning, leadership

techniques, organization and administration, and interrelationships with other fields.

RECR 349. OBSERVATION AND FIELD WORK IN RECREATION. (5)
Limited to recreation majors. Appropriate observations and field work placement will be selected and assigned on the basis of the student's interest and future employment plans. The field work experience itself will be expected to provide, (1) face to face leadership activity, (2) participation in staff activities and responsibilities as feasible (filing, making of reports, etc.), and (3) exposure to any and all intra and inter-agency or department relationships and activities (budget hearings, training sessions, board meetings, etc.)

RECR 375. INTRODUCTION TO THERAPEUTIC RECREATION. (3)
A study of the nature of physical and emotional deficiency and illness, the effect upon them of various recreation skills, activities and programs, and the methods recommended for the latter's implementation.

FOR ADVANCED UNDERGRADUATES AND GRADUATES

RECR 415. QUANTITATIVE METHODS. (3)
A course covering the statistical techniques most frequently used in research pertaining to recreation. An effort will be made to provide the student with the necessary skills, and to acquaint him with the interpretations and practical applications of these techniques.

RECR 420. PROGRAM PLANNING. (3)
Prerequisites: RECR 130 or RECR 325. Study of the various aspects, problems and practices of agency, military, 'exceptional,' and governmental recreation programs and their planning (with particular emphasis on playground, community and teen center plans and procedures). Observations will be required.

RECR 426. INDUSTRIAL EMPLOYEE RECREATION. (3)
An introductory study of the philosophy of and practices and problems in industrial recreation. Where possible the course will include opportunities for observation and for meeting visiting specialists.

RECR 432. PHILOSOPHY OF RECREATION. (3)
A study of the meanings, relationships, and services of recreation as expressed by past and present authorities and leaders. This course should be of interest to people active in education, social work, and related fields.

RECR 450. CAMP MANAGEMENT. (3)
Prerequisite: RECR 150 or experience. An advanced camping course for those students with previous training and experience; organization, administration, programming, current trends, evaluation, and special problems. Whenever possible, visiting specialists and field trips will be included.

RECR 454. OUTDOOR EDUCATION. (6)
Field experience and resident camping in an outdoor setting will be used to present the activities and techniques recommended for modern outdoor education practice. Where possible groups of participants will be utilized as subjects for practice instructional work. Activity will emphasize not only the subject matter of science and education but also the broad concepts of conservation, worthy use of leisure time, education for democratic living, etc.

RECR 460. LEADERSHIP TECHNIQUES AND PRACTICES. (3)
Prerequisite: RECR 130 or 325. A study of the various kinds and levels of leadership exerted by professional and volunteer workers, some of the difficulties and probable weaknesses to be met, and some of the tangible techniques to be used in personnel, staff, and public relationships. The group work approach will be emphasized and used, insofar as possible, in the solution of particular problems that grow out of required field experiences in handling on or off-campus groups.

RECR 463. SUPERVISORY TECHNIQUES IN RECREATION. (3)
A study of the principles, methods, techniques as well as an analysis of the functions of supervision in the recreation and parks environment. This course is designed to advance the student's understanding of the art of building human relationships, and to apply the emerging concepts and principles of modern supervision to practical situations in which administrators, supervisors, leaders (both professional and paraprofessional) and volunteers are working.

RECR 476. INSTITUTIONAL RECREATION. (3)
An introductory study of the philosophy of and practices in hospital and institutional recreation. Where possible the course will include opportunities for observation and for meeting practicing specialists.

RECR 489. FIELD LABORATORY PROJECTS AND WORKSHOP. (1-6)
A course designed to meet the needs of persons in the field with respect to workshops and research projects in special areas of knowledge not covered by regularly structured courses.

RECR 490. ORGANIZATION AND ADMINISTRATION OF RECREATION. (3)
A study of the organizational patterns and administrative problems involved in the various types of operating recreation departments, and agencies; forms of organization; finance and budget; personnel; public relations.

RECR 495. PLANNING, DESIGN AND MAINTENANCE OF PARK AND RECREATION AREAS AND FACILITIES. (3)
A study of the relation of the Recreation and Park system to the total community planning process; area layout, design and maintenance of facilities. Field experience will include the conduct of community surveys and preparation of site plans as requested by community groups. The development of such studies will include inspection of areas, site analysis, preparation of plans, and their presentation to the community where possible.

AGRICULTURAL AND EXTENSION EDUCATION

RLED 302. INTRODUCTION TO AGRICULTURAL EDUCATION. (2)
An overview of the job of the teacher of agriculture; examination of agricultural education programs for youth and adults.

RLED 303. TEACHING MATERIALS AND DEMONSTRATIONS. (2)
Principles and practices of the demonstration method; construction and use of visual aids in teaching agriculture.

RLED 305. TEACHING YOUNG AND ADULT FARMER GROUPS. (1)
Characteristics of young and adult farmer instruction in agriculture. Determining needs for and organizing a course; selecting materials for instruction; and class management. Emphasis is on the conference method of teaching.

RLED 311. TEACHING SECONDARY VOCATIONAL AGRICULTURE. (3)
A comprehensive course in the work of high school departments of vocational agriculture. It emphasizes particularly placement, supervised farming programs, the organization and administration of Future Farmer activities, and objectives and methods in all-day instruction.

RLED 313. STUDENT TEACHING. (5)
Prerequisite: Satisfactory academic average and permission of instructor. Full-time student teaching in an off-campus student teaching center under an approved supervising teacher of agriculture. Participating experience in all aspect of the work of a teacher of agriculture.

RLED 315. STUDENT TEACHING. (1-4)
Prerequisite: Satisfactory academic average and permission of Instructor. Full-time observation and participation

in work of teacher of agriculture in off-campus student teaching center. Provides students opportunity to gain experience in the summer program of work, to participate in opening of school activities, and to gain other experience needed by teachers.

RLED 323. DEVELOPING YOUTH PROGRAMS. (3)
A study of concepts involved in planning and executing programs developed to meet the needs of youth especially those living in rural and suburban areas. Emphasis will be placed on the identification of attitudes, needs, and problems of youth in all socio-economic levels. An analysis of methods or working with youth groups and developing volunteer leaders will also be included.

RLED 325. DIRECTED EXPERIENCE IN EXTENSION EDUCATION. (1-5)
Prerequisite: Satisfactory academic average and permission of instructor. Full-time observation and participation in selected aspects of extension education in an approved training county.

RLED 327. PROGRAM PLANNING IN EXTENSION. (3)
A study of the concepts involved in the planning, execution and evaluation of educational programs. Students wi'l apply the concepts while assisting with the planning and evaluation of programs. Special emphasis will also be given to Extension Education.

RLED 398. SEMINAR IN AGRICULTURAL EDUCATION. (1)
Examination of current literature, reports and discussions of problems, trends, and issues in agricultural education.

RLED 422. EXTENSION EDUCATION. (2)
The Agricultural Extension Service as an educational agency. The history, philosophy, objectives, policy, organization, legislation and methods used in Extension work.

RLED 423. EXTENSION COMMUNICATIONS. (2)
An introduction to communications in teaching and within an organization, including barriers to communication, the diffusion process and the application of communication principles person to person, with groups and through mass media.

RLED 426. DEVELOPMENT AND MANAGEMENT OF EXTENSION YOUTH PROGRAMS. (3)
Designed for present and prospective state leaders of extension youth programs. Program development, principles of program management, leadership development and counseling; science, career selection and citizenship in youth programs, field experience in working with low income families' youth, urban work.

RLED 464. RURAL LIFE IN MODERN SOCIETY. (3)
Examination of the many aspects of rural life that affect and are affected by changes in technical, natural and human resources. Emphasis is placed on the role which diverse organizations, agencies and institutions play in the education and adjustment of rural people to the demands of modern society.

RLED 487. CONSERVATION OF NATURAL RESOURCES. (3)
Designed primarily for teachers. Study of state's natural resources—soil, water, fisheries, wildlife, forests, and minerals—natural resources problems and practices. Extensive field study. Concentration on subject matter. Taken concurrently with RLED 497 in summer season.

RLED 488. CRITIQUE IN RURAL EDUCATION. (1)
Current problems and trends in rural education.

RLED 489. CRITIQUE IN RURAL EDUCATION. (1)
Current problems and trends in rural education.

RLED 497. CONSERVATION OF NATURAL RESOURCES. (3)
Designed primarily for teachers. Study of state's natural resources—soil, water, fisheries, wildlife, forests, and minerals—natural resources problems and practices. Extensive field study. Methods of teaching conservation included Taken concurrently with RLED 487 in summer season.

RLED 499. SPECIAL PROBLEMS. (1-3)
Prerequisite: Staff approval.

RUSSIAN

RUSS 001. ELEMENTARY RUSSIAN FOR GRADUATE STUDENTS. (3)
Graduate students should register as auditors only. Intensive elementary course in the Russian language designed particularly for graduate students who wish to acquire a reading knowledge.

RUSS 111. ELEMENTARY RUSSIAN. (3)
Three recitations and one laboratory hour per week. Elements of grammar, pronunciation and conversation; exercises in translation.

RUSS 112. ELEMENTARY RUSSIAN. (3)
Three recitations and one laboratory hour per week. Elements of grammar, pronunciation and conversation; exercises in translation.

RUSS 114. INTERMEDIATE RUSSIAN. (3)
Three recitations per week. Additional laboratory. Prerequisite: RUSS 112 or equivalent. Reading of texts designed to give some knowledge of Russian life, thought and culture.

RUSS 115. INTERMEDIATE RUSSIAN. (3)
Three recitations per week, additional laboratory. Prerequisite: RUSS 114 or equivalent. Reading of text designed to give some knowledge of Russian life, thought and culture.
S—SCIENTIFIC
Prerequisite: RUSS 114 or equivalent. Reading of technical and scientific prose.

RUSS 201. CONVERSATION AND COMPOSITION. (3)
Prerequisite: RUSS 115 or equivalent. A practical language course recommended for all students continuing in Russian.

RUSS 202. CONVERSATION AND COMPOSITION. (3)
Prerequisite: RUSS 115 or equivalent. A practical language course recommended for all students continuing in Russian.

RUSS 301. REVIEW GRAMMAR AND COMPOSITION. (3)
Prerequisite: RUSS 115 or equivalent. Designed to give a thorough training in the structure of the language; drill in Russian composition.

RUSS 302. REVIEW GRAMMAR AND COMPOSITION. (3)
Prerequisite: RUSS 115 or equivalent. Designed to give a thorough training in the structure of the language; drill in Russian composition.

RUSS 311. ADVANCED CONVERSATION. (3)
Prerequisite: RUSS 201, 202, or consent of instructor. For students who wish to develop fluency and confidence in speaking the language.

RUSS 312. ADVANCED CONVERSATION. (3)
Prerequisite: RUSS 201, 202 or consent of instructor. For students who wish to develop fluency and confidence in speaking the language.

RUSS 321. SURVEY OF RUSSIAN LITERATURE. (3)
Prerequisite: RUSS 115 or equivalent. An elementary survey of Russian literature.

RUSS 322. SURVEY OF RUSSIAN LITERATURE. (3)
Prerequisite: RUSS 115 or equivalent. An elementary survey of Russian literature.

RUSS 361. 19th CENTURY RUSSIAN LITERATURE IN TRANSLATION. (3)
Development of Russian literary thought in the Russian novel and short prose of the 19th century. Influence of Western literatures and philosophies considered.

RUSS 362. 19th CENTURY RUSSIAN LITERATURE IN TRANSLATION. (3)
Development of Russian literary thought in the Russian

novel and short prose of the 19th century. Influence of western literatures and philosophies considered.

RUSS 363. SOVIET LITERATURE IN TRANSLATION. (3)
Russian literature since 1917, both as a continuation of pre-Revolutionary traditions and as a reflection of Soviet ideology.

RUSS 399. DIRECTED STUDY IN RUSSIAN. (1-3)
For advanced students, by permission of department chairman. Course may be repeated for credit if content differs to a maximum of six hours.

RUSS 401. ADVANCED COMPOSITION. (3)

RUSS 402. ADVANCED COMPOSITION. (3)

RUSS 441. RUSSIAN LITERATURE OF THE 18th CENTURY. (3)

RUSS 451. RUSSIAN LITERATURE OF THE 19th CENTURY. (3)

RUSS 452. RUSSIAN LITERATURE OF THE 19th CENTURY. (3)

RUSS 461. SOVIET RUSSIAN LITERATURE. (3)

RUSS 462. SOVIET RUSSIAN LITERATURE. (3)

RUSS 465. MODERN RUSSIAN POETRY. (3)

RUSS 466. MODERN RUSSIAN DRAMA. (3)

RUSS 467. MODERN RUSSIAN FICTION. (3)

RUSS 470. APPLIED LINGUISTICS. (3)
The nature of applied linguistics and its contributions to the effective teaching of foreign languages. Comparative study of English and Russian, with emphasis upon points of divergence. Analysis, evaluation and construction of related drills.

SOCIOLOGY

SOCY 100. INTRODUCTION TO SOCIOLOGY. (3)
Sociological analysis of the American social structure; metropolitan, small town, and rural communities; population distribution, composition and change; social organization.

SOCY 110. RURAL SOCIOLOGY. (3)
Prerequisite: SOCY 100 or 200. Rural life in America; its people, social organization, culture patterns, and problems.

SOCY 120. URBAN SOCIOLOGY. (3)
Prerequisite: SOCY 100 or 200. Urban growth and expansion; characteristics of city populations; urban institutions and personality patterns; relations of city and country.

SOCY 200. PRINCIPLES OF SOCIOLOGY. (3)
Required for students planning to major in sociology. The basic forms of social interaction, processes, and structures. The basic forms of human associations and interactions, social processes; institutions, culture, human nature and personality.

SOCY 201. INTRODUCTORY STATISTICS FOR SOCIOLOGY. (3)
Two lectures and two hours drill per week. Prerequisites: SOCY 100 or 200 and MATH 110 or equivalent. Elementary descriptive and inferential statistics. Measures of central tendency and variation, non-parametric and parametric measures of association and correlation, one-way analysis of variance, hypothesis testing, point and interval estimates. Required of all sociology majors.

SOCY 202. INTRODUCTION TO RESEARCH METHODS IN SOCIOLOGY. (3)
Prerequisite: SOCY 200 and 201. Nature and scope of sociological research problem formulation, case study methods, observational methods, survey method, experimental methods, documentary methods, miscellaneous methods. Required of all sociology majors.

SOCY 203. SOCIOLOGICAL THEORY. (3)
Prerequisite: SOCY 200. Development of the science of sociology; historical backgrounds; recent theories of society. Required of all sociology majors.

SOCY 210. SOCIAL PROBLEMS. (3)
Prerequisites: SOCY 100 or 200 and sophomore standing. An examination of the nature of social problems; perspectives on social problems; the ways in which social problems are implicated in the organization of society; and a detailed study of selected social problebs including social conflict and social inequality.

SOCY 215. SOCIAL INSTITUTIONS. (3)
Prerequisites: SOCY 100 or 200. Nature and function of social institutions; the perpetuation of behavior through customs and social norms; typical contemporary American institutions.

SOCY 230. DYNAMICS OF SOCIAL INTERACTION. (3)
Prerequisite: SOCY 100 or 200. Social psychology of groups such as committees, teams, clubs, sects, social movements, crowds and publics. Origin of the social self; role behavior, inter-group and intra-group relations.

SOCY 310. INTRODUCTION TO SOCIAL WELFARE. (3)
Prerequisite: SOCY 100 or 200. General survey of the field of social welfare activities; historical development, growth, functions and specialization of agencies and services, private and public.

SOCY 311. SENIOR SEMINAR IN SOCIAL WORK. (3)
Prerequisites: SOCY 100 or 200 and permission of the instructor. Experience in applying social science theory to concrete social problems. Cases of psychological, social and biological malfunction will be studied, and specific treatment plans constructed. The interrelated nature of several causes of deviant behavior will be stressed. As will the importance of understanding and using the principles of several social science disciplines.

SOCY 330. COMMUNITY ORGANIZATION. (3)
Prerequisite: SOCY 100 or 200. Community organization and its relation to social welfare; analysis of community needs and resources; health, housing, recreation; community centers; neighborhood projects.

SOCY 359. SOCIAL FIELD TRAINING. (1-3)
Prerequisites: Permission of instructor and at least 12 hours of Sociology credit. Enrollment restricted to available placements. The student will be responsible to an agency for a program of in-service training. Group meetings, individual conferences and written program reports will be a required part of the course.

SOCY 388. INDEPENDENT RESEARCH IN SOCIOLOGY. (3)
H—HONORS
Prerequisite: SOCY 200 and consent of instructor. For honors students only. This course is designed for the needs of the honors students in sociology.

SOCY 389. INDEPENDENT READING COURSE IN SOCIOLOGY. (3)
H—HONORS
Prerequisite: SOCY 200 and consent of instructor. For honors students only. This course is designed for the needs of the honors students in sociology.

SOCY 399. INDEPENT STUDY IN SOCIOLOGY. (1-6)
Prerequisites: Written consent of faculty under whose direction the study is to be performed, and at least 12 hours of sociology credit to include one or more of the following: SOCY 201; 202, 203. Integrated reading or research under direction and supervision of faculty member.

SOCY 401. INTERMEDIATE STATISTICS FOR SOCIOLOGISTS. (3)
Prerequisites: SOCY 201 or equivalent and six additional credits in sociology. Intermediate correlation techniques, analysis of variance, sampling, additional non-parametric techniques, additional topics in inferential statistics. Required of all candidates for the M.A. degree.

SOCY 410. POPULATION I. (3)
Prerequisite: Junior standing; SOCY 100 or 200 *not* required. Population distribution and growth; sources of demographic data; population composition; population

theories; mortality; fertility and family planning; migration; and population problems and policy.

SOCY 411. POPULATION II. (3)
Prerequisites: SOCY 410 and SOCY 201 or equivalent statistical training. Application of statistical techniques employed in the analysis of census and vital statistics data, including methods of population standardization, life table construction, and use of computerized demographic data.

SOCY 421. INTERCULTURAL SOCIOLOGY. (3)
Prerequisite: SOCY 200. On the basis of a comparative study of customs, individual and group behavior patterns and institutions, this course studies the ideologies of America and other modern societies.

SOCY 423. ETHNIC MINORITIES. (3)
Prerequisite: SOCY 100 or 200. Basic social processes in the relations of ethnic groups; immigration groups and the Negro in the United States; ethnic minorities in Europe.

SOCY 424. SOCIOLOGY OF RACE RELATIONS. (3)
Prerequisite: SOCY 100 or 200. Race as a focus of social relations. Political and collective action centering on race relations. New myths of race. Trends in assimilation of racial groupings.

SOCY 426. SOCIOLOGY OF RELIGION. (3)
Prerequisite: SOCY 100 or 200. Varieties and sources of religious experience. Religious institutions and the role of religion in socal life.

SOCY 427. DEVIANT BEHAVIOR. (3)
Prerequisite: SOCY 100 or 200. Current theories of the genesis and distribution of deviant behavior. Definitions of deviance, labeling theory, secondary deviance. Theories of specific forms of deviant behavior will be examined for their implications for a general theory of deviant behavior.

SOCY 430. SOCIOLOGY OF PERSONALITY. (3)
Prerequisite: SOCY 100 or 200. Development of human nature and personality in contemporary social life; processes of socialization; attitudes, individual differences and social behavior.

SOCY 431. FORMAL AND COMPLEX ORGANIZATIONS. (3)
Prerequisite: SOCY 100 or 200. The concept of formal organization. The study of functioning and control in the operation of bureaucracies such as corporations and in large-scale organizations such as military, religious and educational hierachies. Forms of recruitment, internal mobility and organizational personality. Relations between large-scale organizations and with the larger society.

SOCY 432. COLLECTIVE BEHAVIOR. (3)
Prerequisite: SOCY 100 or 200. Social interaction in mass behavior; communication processes; structure and functioning of crowds, strikes, audiences, mass movements, and the public.

SOCY 433. SOCIAL CONTROL. (3)
Prerequisite: SOCY 100 or 200. Forms, mechanism, and techniques of group influence on human behavior; problems of social control in contemporary society.

SOCY 441. SOCIAL STRATIFICATION. (3)
Prerequisite: 9 credits of sociology. An introduction to the sociology of social stratification. Consideration of the basic concepts and major findings in the field. The relationship of social stratification to the institutional orders of the society.

SOCY 443. THE FAMILY AND SOCIETY. (3)
Prerequisite: SOCY 100 or 200. Study of the family as a social institution; its biological and cultural foundations, historic development, changing structure, and function; the interactions of marriage and parenthood, disorganizing and reorganizing factors in present day trends.

SOCY 445. SOCIOLOGY OF THE ARTS. (3)
Prerequisite: SOCY 100 or 200. Functions of the arts as a social institution. Social role of the artist. Recruitment to and organizational structure of artistic professions. Art forms and social characteristics of audiences. Changing technology and social values as reflected in artistic expression.

SOCY 447. SMALL GROUP ANALYSIS. (3)
Prerequisite: SOCY 100 or 200. Analysis of small group structure and dynamics. Review of research on small groups in factories, military service, schools and communities. Presentation of techniques used in the study of small groups.

SOCY 457. SOCIOLOGY OF LAW. (3)
Prerequisite: SOCY 100 or 200. Law as a form of social control; interrelation between legal and other conduct norms as to their content, sanctions, and methods of securing conformity; law as an integral part of the culture of groups; factors and processes operative in the formation of legal norms as determinants of human behavior.

SOCY 460. SOCIOLOGY OF OCCUPATIONS AND CAREERS. (3)
Prerequisite: SOCY 100 or 200. The sociology of work and occupational life in modern society. Changing occupational ideologies, values and choices, Occupational status systems and occupational mobility. The social psychology of career success.

SOCY 462. INDUSTRIAL SOCIOLOGY. (3)
Prerequisite: SOCY 100 or 200. The sociology of human relations in American industry and business. Complex industrial and business organization as social systems. Social relationships within and between industry, business, community, and society.

SOCY 464. MILITARY SOCIOLOGY. (3)
Prerequisite: SOCY 100 or 200. Social change and the growth of military institutions. Complex formal military organizations. Military service as an occupation or profession. The sociology of military life. Relations between military institutions, civilian communities and society.

SOCY 465. THE SOCIOLOGY OF WAR. (3)
Prerequisite: SOCY 100 or 200. The origin and devolpment of armed forces as institutions, the social causes, operations and results of war as social conflict; the relations of peace and war and revolution in contemporary civilizations.

SOCY 466. SOCIOLOGY OF POLITICS. (3)
Prerequisite: 9 credits of sociology. An introduction to the sociology of political phenomena. Consideration of the basic concepts and major findings in the field; the relationship of the polity to other institutional orders of the society; the relationship of political activity in America to the theory of democracy.

SOCY 470. RURAL-URBAN RELATIONS. (3)
Prerequisite: SOCY 100 or 200. The ecology of population and the forces making for change in rural and urban life; migration, decentralization and regionalism as methods of studying individual and national issues. Applied field problems.

SOCY 471. THE RURAL COMMUNITY. (3)
Prerequisite: SOCY 100 or 200. A detailed study of rural life with emphasis on levels of living, the family, school, and church and organizational activities in the fields of health, recreation, welfare, and planning.

SOCY 473. THE CITY. (3)
Prerequisite: SOCY 100 or 200. The rise of urban civilization and metropolitan regions; ecological process and structure; the city as a center of dominance; social problems, control and planning.

SOCY 498. SELECTED TOPICS IN SOCIOLOGY. (3)
Prerequisite: SOCY 100 or 200. Topics of special interest to advanced undergraduates in sociology. Such courses will be offered in response to student request and faculty interest. No more than 6 credits may be taken by a student in selected topics.

SPANISH

SPAN 101. ELEMENTARY SPANISH. (4)
Introduction to basic structures, with emphasis upon understanding and speaking. Four recitations per week, and one optional laboratory hour. Normally leads to 102, but gifted students may be recommended for 102H.

SPAN 102. ELEMENTARY SPANISH. (4)
Completion of basic structures, with increasing emphasis upon reading skill, reinforced by discussion and composition. Four recitations per week and one optional laboratory hour. Normally leads to 104, but gifted students may be recommended for 104H.

H—HONORS
Limited to students who have been recommended by their instructor in 101. Enriched course of study, with broad reading base and related devevlopment of oral and written expression. Four recitations per week and one optional laboratory hour. Normally leads to 201 or 221 at student's option.

SPAN 103. REVIEW OF ELEMENTARY SPANISH. (4)
Limited to students who have had at least two years of high school Spanish or the equivalent, and who do not qualify for 104. Four recitations per week and one optional laboratory hour. Normally leads to 104.

SPAN 104. INTERMEDIATE SPANISH. (4)
Continued development of the skills of understanding and speaking with supplementary attention to reading and writing. Four recitations per week, and one optional laboratory hour. Normally leads to 201 or 221, at student's option.

H—HONORS
Limited to students who have been recommended by their instructor in 102. Enriched course of study, with broad oral base and related development of reading and writing. Four recitations per week and one optional laboratory hour. Normally leads to 321, 322, 323, or 324 at student's option.

SPAN 201. REVIEW OF ORAL AND WRITTEN SPANISH. (3)
Prerequisite: SPAN 104. A practical language course recommended for all students continuing in Spanish. May be taken concurrently with SPAN 221.

SPAN 211. SPANISH PHONETICS. (3)
Prerequisite: SPAN 104 or equivalent. Descriptive study of the Spanish sound system. Practice in phonetic perception, transcription and articulation. Particular attention to sentence phonetics; juncture, rhythm, stress, pitch.

SPAN 221. INTRODUCTION TO SPANISH LITERATURE. (3)
Prerequisite: SPAN 104. Reading of literary texts, discussion and brief written reports. Conducted in Spanish.

SPAN 230. COMMERCIAL SPANISH. (3)
Prerequisite: SPAN 201 and consent of instructor. Designed to give knowledge of correct commercial Spanish including letters and business forms. Fundamental principles of Spanish shorthand will be included if warranted by the interest and ability of the class.

SPAN 301. REVIEW GRAMMAR AND COMPOSITION. (3)
Prerequisite: SPAN 201 or equivalent. An intensive review of grammar and practice in Spanish composition. Selected readings and literary analysis.

SPAN 302. REVIEW GRAMMAR AND COMPOSITION. (3)
Prerequisite: SPAN 301 or equivalent.

SPAN 311. ADVANCED CONVERSATION. (3)
Prerequisite: SPAN 201 or consent of instructor. Designed to develop fluency and accuracy in speaking Spanish.

SPAN 312. ADVANCED CONVERSATION. (3)
Prerequisite: SPAN 201 or consent of instructor.

SPAN 321. SURVEY OF SPANISH LITERATURE. (3)

SPAN 322. SURVEY OF SPANISH LITERATURE. (3)

SPAN 323. SURVEY OF SPANISH-AMERICAN LITERATURE. (3)
Basic survey of the history of Spanish-American literature.

SPAN 324. SURVEY OF SPANISH-AMERICAN LITERATURE. (3)
Basic survey of the history of Spanish-American literature.

SPAN 401. ADVANCED COMPOSITION. (3)
Exercises in practical stylistics, with special emphasis on idiomatic and syntactic structures. Graduate credit in the College of Education only.

SPAN 402. ADVANCED COMPOSITION. (3)
Exercises in practical stylistics, with special emphasis on idiomatic and syntactic structures. Graduate credit in the College of Education only.

SPAN 404. ORAL PRACTICE FOR NON-NATIVE TEACHERS OF SPANISH. (3)
Prerequisite: Consent of instructor. Development of fluency in Spanish with stress on correct sentence structure, pronunciation and idomatic expression. Graduate credit in College of Education only.

SPAN 408. GREAT THEMES OF THE HISPANIC LITERATURES. (3)
Pervading themes in the literature of Spain or Spanish-America. Each theme will be announced when the course is offered.

SPAN 409. GREAT THEMES OF THE HISPANIC LITERATURES. (3)
Pervading themes in the literature of Spain or Spanish-America. Each theme will be announced when the course is offered.

SPAN 410. LITERATURE OF THE MIDDLE AGES. (3)
Spanish literary history from the 11th through the 15th century. Reading of representative texts. This course covers until 1350.

SPAN 411. LITERATURE OF THE MIDDLE AGES. (3)
Spanish literary history from the 11th through the 15th century. Reading of representative texts. This course covers from 1350 to 1500.

SPAN 412. THE ROMANCERO. (3)
Origin, nature and influence. Extensive reading in each of the respective sub-genres.

SPAN 420. PROSE AND POETRY OF THE 16th CENTURY. (3)
Selected readings and literary analysis.

SPAN 421. PROSE AND POETRY OF THE 16th CENTURY. (3)
Selected readings and literary analysis.

SPAN 424. DRAMA OF THE 16th CENTURY. (3)
From the earliest *autos* and *pasos*, the development of Spanish drama anterior to Lope de Vega, including Cervantes.

SPAN 425. SPANISH CIVILIZATION. (3)
A survey of 2000 years of Spanish history, outlining the cultural heritage of the Spanish people, their great men, traditions, customs, art, and literature, with special emphasis on the interrelationship of social and literary history. Conducted in Spanish. Graduate credit in College of Education only.

SPAN 426. SPANISH CIVILIZATION. (3)
A survey of 2000 years of Spanish history, outlining the cultural heritage of the Spanish people, their great men, traditions, customs, art, and literature, with special emphasis on the interrelationship of social and literary history. Conducted in Spanish. Graduate credit in College of Education only.

SPAN 430. CERVANTES—NOVELAS EJEMPLARES AND DON QUIXOTE. (3)

SPAN 431. CERVANTES—NOVELAS EJEMPLARES AND DON QUIXOTE. (3)

SPAN 434. PROSE AND POETRY OF THE 17th CENTURY. (3)
Selected readings, literary analysis, and discussion of the outstanding prose and poetry of the period, in the light of the historical background.

SPAN 435. PROSE AND POETRY OF THE 17th CENTURY. (3)
Selected readings, literary analysis, and discussion of the outstanding prose and poetry of the period, in the light of the historical background.

SPAN 436. DRAMA OF THE 17th CENTURY. (3)
Devoted to Lope de Vega, dramatic theory and the Spanish stage.

SPAN 437. DRAMA OF THE 17th CENTURY. (3)
Drama after Lope de Vega to Calderon de la Barca and the decline of the Spanish theater.

SPAN 440. LITERATURE OF THE 18th CENTURY. (3)
Traditionalism, neo-Classicism, and pre-Romanticism in prose, poetry, and the theater; esthetics and poetics of the Enlightenment.

SPAN 441. LITERATURE OF THE 18th CENTURY. (3)
Traditionalism, neo-classicism, and pre-romanticism in prose, poetry, and the theater; esthetics and poetics of the enlightenment.

SPAN 446. LATIN-AMERICAN CIVILIZATION. (3)
A survey of the cultural heritage of the Latin American peoples from the pre-Columbian period to the present. Hispanic and other European influences. Conducted in Spanish. Graduate credit in College of Education only.

SPAN 447. LATIN-AMERICAN CIVILIZATION. (3)
A survey of the cultural heritage of the Latin American peoples from the pre-Columbian period to the present. Hispanic and other European influences. Conducted in Spanish. Graduate credit in College of Education only.

SPAN 448. SPECIAL TOPICS IN LATIN AMERICAN CIVILIZATION. (3)
An intensive study of a selected topic related to Latin American civilization. This course may be taken no more than twice. Conducted in Spanish. Graduate credit in College of Education only.

SPAN 452. THE ROMANTIC MOVEMENT IN SPAIN. (3)
Poetry, prose and drama of the Romantic and post-Romantic periods.

SPAN 454. 19th CENTURY FICTION. (3)
Significant nove's of the nineteenth century.

SPAN 456. 19th CENTURY DRAMA AND POETRY. (3)
Significant dramas and poetry of the Realistic period.

SPAN 460. THE GENERATION OF 1898 AND ITS SUCCESSORS. (3)
Authors and works of all genres of the generation of 1898 and those of the immediately succeeding generation.

SPAN 461. THE GENERATION OF 1898 AND ITS SUCCESSORS. (3)
Authors and works of all genres of the generation of 1898 and those of the immediately succeeding generation.

SPAN 462. 20th CENTURY DRAMA. (3)
Significant plays of the twentieth century.

SPAN 464. CONTEMPORARY SPANISH POETRY. (3)
Spanish poetry from the generation of 1927 to the present.

SPAN 466. THE CONTEMPORARY SPANISH NOVEL. (3)
The novel and the short story from 1940 to the present.

SPAN 468. MODERNISM AND POST-MODERNISM IN SPAIN AND SPANISH-AMERICA. (3)
A study of the most important works and authors of both movements in Spain and Spanish-America.

SPAN 469. MODERNISM AND POST-MODERNISM IN SPAIN AND SPANISH-AMERICA. (3)
A study of the most important works and authors of both movements in Spain and Spanish-America.

SPAN 470. APPLIED LINGUISTICS. (3)
Nature of applied linguistics and its contribution to the effective teaching of foreign languages. Comparative study of English and Spanish with emphasis upon points of divergence.

SPAN 480. SPANISH-AMERICAN ESSAY. (3)
A study of the socio-political contents and aesthetic qualities of representative works from the Colonial to the Contemporary period.

SPAN 481. SPANISH-AMERICAN ESSAY. (3)
A study of the socio-political contents and aesthetic qualities of representative works from the Colonial to the Contemporary period, with emphasis on the essay of the 20th century.

SPAN 488. SPANISH-AMERICAN FICTION. (3)
Representative novels and/or short stories from the Wars of Independence to the present or close analysis of major contemporary works. Subject will be announced each time course is offered.

SPAN 489. SPANISH-AMERICAN FICTION. (3)
Representative novels and/or short stories from the wars of independence to the present or class analysis of major contemporary works. Subject will be announced each time course is offered.

SPAN 491. HONORS READING COURSE—POETRY. (3)
H—HONORS
Supervised reading to be taken by students admitted to the honors program or upon consultation with the instructor.

SPAN 492. HONORS READING COURSE—NOVEL. (3)
H—HONORS
Supervised reading to be taken by students admitted to the honors program or upon consultation with the instructor.

SPAN 493. HONORS READING COURSE—DRAMA. (3)
H—HONORS
Supervised reading to be taken by students admitted to the honors program or upon consultation with the instructor.

SPAN 496. HONORS SEMINAR. (3)
H—HONORS
Required of all students in the honors program. Other students will be admitted on special recommendation. Conducted in Spanish. Discussion of a central theme with related investigation by students.

SPAN 498. SPANISH-AMERICAN POETRY. (3)
Main trends, authors and works from the Conquest to Ruben Dario.

SPEECH

SPCH 100. BASIC PRINCIPLES OF SPEECH COMMUNICATION. (3)
Prerequisite:For advanced speech courses. A study of oral communication principles, including verbal and nonverbal language, listening, group dynamics, and public speaking. Emphasis in this course is upon the application of these principles to contemporary problems and upon the preparation of different types of oral discourse. SPCH 100 and 107 may not both be used for credit.

SPCH 107. TECHNICAL SPEECH COMMUNICATION. (2)
A study of oral communication as it is part of technical fields. Emphasis in this course is on the principles and techniques of interviewing, group discussion, listening, and informative and persuasive briefings and speeches. SPCT 100 and 107 may not both be used for credit.

SPCH 110. VOICE AND DICTION. (3)
Emphasis upon the improvement of voice, articulation, and phonation. May be taken concurrently with SPCH 100.

SPCH 125. INTRODUCTION TO INTERPERSONAL COMMUNICATION. (3)
The course will focus on the theory and its application in the area of informal interpersonal communication.

SPCH 200. ADVANCED PUBLIC SPEAKING. (3)
Prerequisite: SPCH 100 or 107. A study of rhetorical principles and models of speech composition in conjunction with the preparation and presentation of specific forms of public address.

SPCH 220. GROUP DISCUSSION. (3)
A study of the principles, methods and types of discussion, and their application in the discussion of contemporary problems

SPCH 230. ARGUMENTATION AND DEBATE. (3)
A study of the fundamental principles of reasoning, analysis, and evidence preparation of debate briefs and presentation of standard academic debate.

SPCH 240. ORAL INTERPRETATION. (3)
The oral interpretation of literature and the practical training of students in the art of reading.

SPCH 325. PARLIAMENTARY LAW. (1)
A study of the principles and application of parliamentary law as applied to all types of meetings. Thorough training in the use of Robert's Rules of Order.

SPCH 330. ARGUMENTATION AND DEBATE IN SOCIETY. (3)
An in-depth study of argumentation in the conduct of contemporary legislative, judicial and political debating.

SPCH 350. FOUNDATIONS OF COMMUNICATION THEORY. (3)
A study of oral communicative behavior, including problems and processes of symbolizations, aspects of oral language, the involvement of the talker and listener, kinds of signals, and self-revelation through speech.

SPCH 356. RHETORIC AND SOCIETY. (3)
A survey of the fundamental aspects and approaches to rhetorical theory.

SPCH 360. THE RHETORIC OF BLACK AMERICA. (3)
A historical-critical survey of the rhetoric of black Americans from the colonial period to the present. Emphasis will be placed on the nature and historical antecedents of contemporary black power rhetoric.

SPCH 400. INTRODUCTION TO RESEARCH METHODOLOGIES IN SPEECH COMMUNICATION. (3)
Prerequisite: Speech communication major or minor or consent of the instructor. An introductory survey of empirical and historical-critical research methodologies in speech communication. The course is designed to prepare the student to understand and to conduct basic research in the field.

SPCH 420. ADVANCED GROUP DISCUSSION. (3)
Prerequisite: SPCH 220 or consent of the instructor. An examination of current research and techniques in the discussion and conference, including extensive practice in various types of discussions. Emphasis is upon small group leadership and dynamics.

SPCH 423. COMMUNICATION PROCESSES IN CONFERENCES. (3)
Prerequisite: One course in speech communication or consent of the instructor. Group participation in conferences, methods of problem solving, semantic aspects of language, and the function of conferences in business, industry and government settings.

SPCH 440. ADVANCED ORAL INTERPRETATION. (3)
Prerequisite: SPCH 240. A study of the advanced theories and techniques employed in the interpretation of prose, poetry and drama. Attention is given to selections, analyses, cuttings, script compilations, and the planning of programs and performances in oral interpretation.

SPCH 441. READERS THEATRE. (3)
Prerequisite: SPCH 240 or consent of the instructor. Theories and techniques of readers theatre will be analyzed to enhance the interpreting and directing abilities of students. Special attention will be given to interpretation and direction of prose, drama, and script compilation.

SPCH 450. CLASSICAL AND MEDIEVAL RHETORICAL THEORY. (3)
Prerequisite: SPCH 200 or consent of instructor. The theories of speech-making and speech composition as propounded by the classical rhetoricians. Special attention is given to Plato, Aristotle, Socrates, Cicero, Quintlian, and St. Augustine.

SPCH 451. RENAISSANCE AND MODERN RHETORICAL THEORY. (3)
Prerequisite: SPCH 200 or consent of the instructor. A study of the development of modern rhetorical theories in Europe and America with consideration of the application of the theories to public address. Special attention is given to Thomas Sheridan, John Walker, George Campbell, Hugh Blair, Richard Whately, James A. Winans, Charles Woolbert, I. A. Richards, and Kenneth Burke.

SPCH 455. ADVANCED SPEECH COMPOSITION. (3)
Prerequisite: SPCH 200 or consent of the instructor. Intensive study of rhetorical principles of speech composition through study of model speeches and through a practicum in speech writing. Emphasis will be placed on the application of research in speech writing to various forms and styles of speeches.

SPCH 460. AMERICAN PUBLIC ADDRESS 1635-1900. (3)
Prerequisite: SPCH 200 or consent of the instructor. Course examines the rhetorical development of major historical movements and influential spokesmen from 1635-1900. Emphasis on the reign of theocracy, the American Revolution, the Presidential Inaugural as a rhetorical type, the Compromise of 1850, the Lincoln-Douglas Debates, the Civil War rhetoric and the populist movement.

SPCH 461. AMERICAN PUBLIC ADDRESS IN THE 20th CENTURY. (3)
Prerequisite: SPCH 200 or consent of the instructor. Course examines the rhetorical development of major historical movements and influential spokesmen from 1900 to the present. Focus on the progressive movement, the rise of labor, women's suffrage, McCarthyism and the evolution of pro- and anti-war rhetoric.

SPCH 462. BRITISH PUBLIC ADDRESS. (3)
Prerequisite: SPCH 200 or consent of the instructor. A biographical, textual and critical-rhetorical study of great British speakers and their influences. Special attention will be devoted to the 'Golden Age' of British oratory and to the forms and styles of contemporary speakers.

SPCH 470. MATERIALS AND PROGRAMS FOR THE DEVELOPMENT OF LISTENING. (3)
The study of research finding, listening tests, materials, equipment, and programs which can be used to develop listening skills.

SPCH 474. COMMUNICATION THEORY AND PROCESS. (3)
A general survey of research and materials in communication theory.

SPCH 475. PERSUASION IN SPEECH. (3)
Prerequisite: SPCH 200 or 230. A study of the bases of persuasion with emphasis on recent experimental developments in persuasion.

SPCH 476. FOUNDATIONS OF SPEECH BEHAVIOR. (3)
This course will provide a study of the acquisition of speech, the elements that influence speech behavior, the influences of speech behavior, and a theoretical framework for the analysis of communication situations. Students will apply the theory to analysis or specific communication situations.

SPCH 489. SPEECH COMMUNICATION WORKSHOP. (1-6)
Workshops devoted to special, in-depth study in speech communication. Course may be repeatable to a maximum of six semester hours.

SPCH 498. SEMINAR. (3)
Prerequisites: Senior standing and consent of instructor. Present-day speech research.

SPCH 499. HONORS SEMINAR. (3)
For Honors students only. Readings, symposiums, visiting lecturers, discussions.

STATISTICS AND PROBABILITY

STAT 250. INTRODUCTION TO RANDOM VARIABLES. (3)
Prerequisite: MATH 221 or MATH 141. Introductory mathematical concepts. Probabilistic concepts. Basic properties of probability. Discrete random variables and their distributions. Continuous variables (intuitive analytic approach). Joint distributions and transformations. Moments and moment generating functions. Law of large numbers and de Moivvre's theorem.

STAT 400. APPLIED PROBABILITY AND STATISTICS I. (3)
Prerequisites: MATH 221 or MATH 141. Random variables, common distributions, moments, law of large numbers and central limit theorem. Sampling methods, estimation of parameters, testing of hypotheses, analysis of variance, regression, and correlation.

STAT 401. APPLIED PROBABILITY AND STATISTICS II. (3)
Prerequisites: STAT 400 (MATH 241 recommended). Point estimation, sufficient, unbiased, and consistent estimators. Minimum variance and maximum likelihood estimators. Interval estimation. Testing of hypotheses. Regression and linear hypotheses. Sampling distributions. Experimental designs. Sequential tests, elements of nonparametric methods.

STAT 410. INTRODUCTION TO PROBABILITY THEORY. (3)
Prerequisite: MATH 241. Probability and its properties. Random variables and distribution functions in one and several dimensions. Moments. Characteristic functions. Limit theorems.

STAT 411. INTRODUCTION TO STOCHASTIC PROCESSES. (3)
Prerequisites: STAT 410, or MATH 410 and one of STAT 250, or STAT 400. Elementary stochastic processes. Renewal process random walks, branching process, discrete Markov chains, first passage times. Markov chains with a continuous parameter, bith and death processes. Stationary processes and their spectral properties.

STAT 420. INTRODUCTION TO STATISTICS I. (3)
Prerequisite: STAT 410, or STAT 400 and MATH 410. Short review of probability concepts including sampling distributions. Interval estimation. Theory of order statistics. Tolerance limits. Limit distributions and stochastic convergence. Sufficient statistics. Completeness and stochastic independence. Rao-Blackwell theorem.

STAT 421. INTRODUCTION TO STATISTICS II. (3)
Prerequisite: STAT 420, or STAT 401 and MATH 410. Loss and risk functions. Statistical decisions. Optimality criteria. Uniformly minimum risk procedures. Bayesian risk, minimax principle. Point, estimation theory. Statistical hypotheses and optimal tests. Likelihood ratio tests. Elements of linear hypotheses, analysis of variance and sequential theory.

STAT 450. REGRESSION AND VARIANCE ANALYSIS. (3)
Prerequisite: STAT 401 or STAT 420. One, two three and four way layouts in analysis of variance fixed effects models, linear regression in several variables, Gauss-Markov-theorem, multiple regression analysis, experimental designs.

STAT 464. INTRODUCTION TO BIOSTATISTICS. (3)
Prerequisite: One semester of calculus and junior standing. Probabilistic models. Sampling. Some applications of probability in genetics. Experimental designs. Estimation of effects of treatment. Comparative experiments. Fisher-Irwin test. Wilcoxon tests for paired comparisons.

STAT 470. LINEAR AND NONLINEAR PROGRAMMING. (3)
Prerequisite: MATH 240 or MATH 400. Duality theorem and minimax theorem for finite matrix games. Structure of linear and nonlinear solutions with perturbations. Various solution techniques of linear, quadratic, and convex programming methods. Special integer programming models (transportation and traveling salesman problems). Network theory with max-flow-min-cut theorem.

TEXTILES

TEXT 105. TEXTILES IN CONTEMPORARY LIVING. (3)
Three lectures per week. A multidisciplinary approach to the consumer in the near environment with emphasis on apparel and environmental textiles.

TEXT 150. INTRODUCTION TO TEXTILE MATERIALS. (3)
Two lectures and one two-hour laboratory per week. An introduction to the properties of textile materials. Behavior of textile materials are observed in relation to environmental conditions which influence aesthetics, comfort and performance.

TEXT 250. TEXTILE MATERIALS—EVALUATION AND CHARACTERIZATION. (3)
Two lectures and one two-hour laboratory per week. Prerequisite: TEXT 150. An investigation of the behavior of textile materials in relation to environmental factors and conditions of service influencing performance, comfort and aesthetics. Laboratory experience provides an opportunity to explore a variety of textile materials and methods of evaluation.

TEXT 355. ENVIRONMENTAL TEXTILES. (3)
Three lectures per week. Prerequisite: TEXT 150. A consideration of the properties, performance and care of textile materials other than clothing used in the near environment. Included are furnishings, floor coverings, wall treatments and recreational and structural materials. Environmental conditions such as soiling, heat, radiation, weathering, aging, moisture and solvents will be considered.

TEXT 385. JUNIOR HONORS SEMINAR. (1)
Limited to juniors in the departmental Honors Program. Readings, reports and discussion of selected topics.

TEXT 452. TEXTILE SCIENCE—CHEMICAL STRUCTURES AND PROPERTIES OF FIBERS. (3)
Two lectures and one three-hour laboratory per week. Prerequisites: CHEM 104 or consent of instructor. The chemical structure, properties and reactions of the major classes of natural and man-made fibers. Emphasis is placed upon the relationship between molecular structure and physical properties of fibers and fabrics. Laboratory includes chemical identification of fibers, preparation of selected fibers and examination of chemical reactions and properties of fibers.

TEXT 454. TEXTILE SCIENCE—FINISHES. (3)
Two lectures and one three-hour laboratory per week. Prerequisite: TEXT 452 or consent of instructor. A study of the chemical reactions and mechanisms involved in imparting water repellance, crease resistance and crease recovery properties, shrink-resistance, flame resistance, soil-release properties and moth and mildew resistance to textile materials. Properties of the finished material which effect its end-use will also be examined. Laboratory work includes the application of finishes, identification of finishes and a study of the properties of finished fabrics.

TEXT 456. TEXTILE SCIENCE—CHEMISTRY AND PHYSICS OF FIBERS AND POLYMERS. (3)
Two lectures and one three-hour laboratory per week. Prerequisite: Consent of instructor. The theory of fiber structure and its relationship to chemical and physical properties of natural and man-made fibers. Laboratory includes study of performance of textile materials in relation to their chemical and physical properties.

TEXT 463. HISTORY OF TEXTILES. (3)
Three lectures per week. Prerequisite: TEXT 150 or consent of instructor. A study of historic and contemporary fibers and fabrics. Emphasis will be placed on the analysis of designs and techniques of decorating fabrics and the relationship of textiles to the aesthetic and developmental cultures of society.

TEXT 465. ECONOMICS OF THE TEXTILE AND APPAREL INDUSTRIES. (3)
Three lectures per week. Prerequisites: ECON 201 and 203. Trends in the production and consumption of textiles and apparel; economic analysis of the textile and apparel industries; factors affecting changes in output, price, location and market structure.

TEXT 488. SENIOR HONORS THESIS. (1-4)
Limited to undergraduate students in the departmental Honors Program. An independent literary, laboratory of field study, conducted throughout the student's senior year. Student should register in both fall and spring.

TEXT 498. SPECIAL STUDIES. (2-4)
Independent study by an individual student or by a group of students in adanced work not otherwise provided in the department. Students must prepare a description of the study they wish to undertake. The plan must be approved by the faculty directing the study and the department chairman.

TEXTILES AND APPAREL

TXAP 221. APPAREL I. (3)
Six hours of laboratory per week. A study of the fundamental principles and processes of pattern design and apparel construction. Students will relate flat pattern and construction techniques to apparel design problems.

TXAP 222. APPAREL II. (3)
Six hours of laboratory per week. Prerequisites: TXAP 221 and TEXT 150. A continuation of Apparel I involving more advanced problems. Emphasis is placed on successful integration of pattern design with construction processes in contemporary fabrics.

TXAP 385. JUNIOR HONORS SEMINAR. (1)
Limited to juniors in the departmental honors program. Readings, reports and discussion of selected topics.

TXAP 420. APPAREL DESIGN—DRAPING. (3)
Two three-hour laboratory periods per week. Prerequisites: APDS 101 and TXAP 222. APDS 220 recommended but not required. Students explore pattern design through draping on the human form. Emphasis is on the interrelationship between material, design and form.

TXAP 425. APPAREL DESIGN—EXPERIMENTAL PROCESSES. (3)
Two three-hour laboratory periods per week. Prerequisites: APDS 101, TEXT 250, and TXAP 222. Processes are related to fiber and fabric characteristics, style and end-use. Opportunities are provided for students to: 1) learn advanced construction and tailoring techniques 2) explore, adapt and create new processes with modern textile materials and 3) evaluate results in terms of design quality.

TXAP 441. CLOTHING AND HUMAN BEHAVIOR. (3)
Three lectures per week. Prerequisites: PSYC 100 and SOCY 100. An exploration of socio-psychological approaches to the study of clothing in relation to human behavior. Social and psychological theories will be examined as possible framework for the study and investigation of clothing.
Three lectures per week. The wrap-style dress. A critical study of the various forms of dress; analyzing shape and form of garments and the component parts of which they are made, taking special note of the distinctive styles and unique shapes which help distinguish one period from another; relating the history of costume to events, to achievements, to the social attitudes and development of the various times and cultures of man.

TXAP 447. HISTORY OF COSTUME II. (3)
Three lectures per week. The shaped-style dress. A critical study of the various forms of dress; analyzing shape and form of garments and the component parts of which they are made, taking special note of the distinctive styles and uniue shapes which help distinguish one period from another; relating the history of costume to events, to achievements, to the social attitudes and development of the various times and culture of man.

TXAP 488. SENIOR HONORS THESIS. (1-4)
Limited to students in the department Honors Program. An independent literary, laboratory or field study, conducted throughout the student's senior year. Student should register in both fall and spring.

TXAP 498. SPECIAL STUDIES. (2-4)
Independent study by an individual student or by a group of students in advanced work not otherwise provided in the department. Students must prepare a description of the study they wish to undertake. The plan must be approved by the faculty directing the study and the department chairman.

UNIVERSITY COLLEGE STUDY TOURS

UCST 199. WORKSHOP IN FOREIGN CULTURES. (1-6)
Generally limited to students in the first two years of college. A supervised study tour designed to take advantage of the special circumstances and facilities of University College. A course which makes it possible to observe and experience culture of various countries through travel, directed field study and an integrated series of lectures. Lectures may cover the historical, geographical, political, economic, intellectual and social aspects of a country or area. A final examination is required. The maximum number of credits that may be earned under this course symbol is six semester hours: This course designation may be used one or more times until six semester hours have been earned. Credit will be determined by the length and academic content of the tour. Any student planning to enroll in this course must obtain prior approval from the dean of his college regarding acceptance of credits to fulfill specific degree requirements.

UCST 499. ADVANCED WORKSHOP IN FOREIGN CULTURES. (1-6)
A supervised study tour designed to take advantage of the special circumstances and facilities of University College. Related courses and readings should precede tour. Directed field study and integrated series of lectures combined with travel provide in-depth study of the cultures of other countries. Lectures may cover the historical, geographical, political, economic, intellectual and social aspects of a country or area. A term paper and final examination are required. The maximum number of credits that may be earned under this course symbol is six semester hours: this course designation may be used one or more times until six semester hours have been earned. Credit will be determined by the length and academic content of the tour. Any student planning to enroll in this course must obtain prior approval from the dean of his college regarding acceptance of credits to fulfill specific degree requirements.

URBAN STUDIES

URBS 210. SURVEY OF THE FIELD OF URBAN STUDIES. (3)
Definition of urbanism and urbanization as historical processes; urban growth of the United States; conceptualization of the metropolis in the United States; three interdisciplinary approaches to urban systems—(1) environmental—ecological—physical (2) institutional—behavioral—socioeconomic, (3) historical—cultural—artistic; urban crises, problems, and need for solutions.

URBS 260. INTRODUCTION TO INTERDISCIPLINARY URBAN STUDIES. (3)
The goals of the course are to expose the student to the American City (its history, problems, and future) and to develop the student's appreciation for the city's unique characteristics. In an effort to achieve these goals, the course consists of three phases: an interdisciplinary approach, an urban gaming laboratory, and student projects.

URBS 320. THE CITY AND THE DEVELOPING NATIONAL CULTURE OF THE UNITED STATES. (3)
Definition of national culture as contained in values,

ideas, ideology, and moral standards but expressed in objects and activities. History of the city in the United States as related to cultural phases; the city and innovation in architecture and sculpture, in literature and the fine arts; individual cities as creators of cultural history; the city and mass culture.

URBS 350. INTRODUCTION TO URBAN FIELD STUDY. (3)
Instruction in the techniques of inquiry into urban conditions. Training in use of descriptive statistics to summarize data. Selection of problems for study, design of research, preparing conclusions. Comparison of team-research approach to individual investigation. Study of the urban community through field projects.

URBS 395. PRO-SEMINAR IN URBAN LITERATURES. (3)
Critique of urban studiies literature in terms of the three interdisciplinary distinctions. Term papers dealing with research problems and trend analysis of the literature in these three areas. Students emphasize the phase of urban studies most relevant to them.

URBS 399. INDEPENDENT STUDY IN URBAN TOPICS. (3)
Directed research and study of selected aspects of urban affairs.

URBS 430. PRACTICUM IN THE URBAN COMMUNITY AND URBAN ORGANIZATIONS. (3)
Supervised field training in urban-oriented programs. Areas of interest emphasized are: (1) neighborhoods and communities, (2) organizations and agencies, (3) specific programs. The student will be assigned to a specific agency or project and will be responsible to that agency. Class meetings, written reports, instructor conferences, and a student's critique of his experience are included.

URBS 480. URBAN THEORY AND SIMULATION. (3)
Review of early theories of the city. Contemporary theories of the city as a physical and an institutional system. Urban theory as integration of information involving economic, political, and social dimensions of contemporary cities. Simulation and gaming as theory testing; urban simulation and gaming as theory building.

ZOOLOGY

ZOOL 101. GENERAL ZOOLOGY. (4)
Three lectures and one two-hour laboratory period a week. ZOOL 101 and 102 satisfy the freshman premedical requirement in general biology. An introduction to the modern concepts of biological principles and animal life. Emphasis will be placed upon the functional aspects of living systems with a survey of the physical and chemical bases of all life processes.
H—HONORS

ZOOL 102. THE ANIMAL PHYLA. (4)
Two lectures and two two-hour laboratory periods a week. Prerequisites: ZOOL 101 or BOTN 101. A study of the anatomy, classification and life histories of representative animals, invertebrates and vertebrates.

ZOOL 146. HEREDITY AND MAN. (3)
Three lecture—discussion periods a week. A course for non-science students who endeavor to gain an understanding of human genetics so they can intelligently consider how recent discoveries and environmental changes may effect the future of human heredity.

ZOOL 201. HUMAN ANATOMY AND PHYSIOLOGY. (4)
Two lectures and two two-hour laboratory periods a week. Prerequisite: ZOOL 101. For students who desire a general knowledge of human anatomy and physiology.

ZOOL 202. HUMAN ANATOMY AND PHYSIOLOGY.(4)
Two lectures and two two-hour laboratory periods a week. Prerequisite: ZOOL 201. A continuation of ZOOL 201.

ZOOL 205. HISTORY OF ZOOLOGY. (1)
One lecture a week. Prerequisites: A general Grade Point Average of 3.2 and a GPA in biological subjects of 3.5, or permission of the instructor. A course in the history of the development of zoology involving the historical figures, experiments and ideas which contributed to modern concepts.

ZOOL 206. ZOOLOGLICAL LITERATURE. (1)
One lecture a week. Prerequisites: A general Grade Point Average of 3.2 and a GPA in biological subjects of 3.5, or permission of the instructor. Discussion of zoological literature, its use and significance.

ZOOL 207. DEVELOPMENT OF THE HUMAN BODY. (2)
Five lectures a week. A study of the main factors affecting the growth and development of the child with special emphasis on normal development.

ZOOL 209. BASIC STUDY IN ZOOLOGY. (1-4)
Prerequisites: A general Grade Point Average of 3.2 and a GPA in biological subjects of 3.5, or permission of the instructor. Independent study, with supporting laboratory experiments, of the basic disciplines in zoology. Repeatable up to 8 hours credit.

ZOOL 246. GENETICS. (4)
Three lectures, one two-hour laboratory discussion period per week. Prerequisites: ZOOL 101 or BOTN 101, or equivalent, and one semester of college chemistry. A consideration of the basic principles of heredity.

ZOOL 270. POPULATION BIOLOGY AND GENERAL ECOLOGY. (3)
Three lectures per week. No prerequisites. Designed for elective credit. General introduction to population and community biology, with consideration of principles of evolution, population genetics, population growth and steady states, age structure of populations, multispecies, dependencies, and exosystem energetics. Illustrations will be drawn both from natural populations and human populations.

ZOOL 280. ECOLOGY OF THE OCEANS. (3)
Three lectures a week. Prerequisites: an introductory course in biological principles plus one course in either chemistry geology, or physics. An introductory consideration of sea life various ecosystems and man's potential uses and misuses of the sea.

ZOOL 290. COMPARATIVE VERTEBRATE MORPHOLOGY. (4)
Two lectures and two three-hour laboratory periods a week. Prerequisites: ZOOL 101 and 102 or equivalent. A comparative study of the evolution of vertebrate organ systems supplemented by laboratory dissection and demonstrations.

ZOOL 308. HONORS SEMINAR. (1)
H—HONORS
One discussion period a week. Prerequisite: Participation in honors program. Guided discussion of topics of current interest. Repeatable to total of 4 hours credit.

ZOOL 309. HONORS INDEPENDENT STUDY. (1-4)
H—HONORS
Prerequisite: Participation in honors program. Study of classical material by way of guided independent study and laboratory experiments. Repeatable to a total of 12 hours credit.

ZOOL 318. HONORS RESEARCH. (1-2)
H—HONORS
Prerequisite: Participation in honors program. A laboratory research problem which is required each semester during honors participation and culminates in a honors thesis. Repeatable to a total of 8 hours credit.

ZOOL 319. SPECIAL PROBLEMS IN ZOOLOGY. (1-2)
Prerequisites: Major in zoology or biological sciences; a minimum of 3.0 cumulative average in the biological sciences, and consent of instructor. Research or integrated reading in zoology. A student may register several times and receive up to 8 semester hours of credit.

ZOOL 328. SELECTED TOPICS IN ZOOLOGY. (1-4)
Lectures, seminars, mini-courses and other special instruction in various zoological subjects. The contents and format of the course change frequently and students

may register for it more than once up to a total of six credits.

ZOOL 411. CELL BIOLOGY. (4)
Two lectures, one one-hour demonstration-discussion period and one three-hour laboratory period a week. Prerequisites: Two years of zoology and a year of organic chemistry, or permission of the instructor. A study of cell structure and function with an emphasis on the activity of subcellular organoids and the mechanisms of coordination and control of cell function.

ZOOL 413. BIOPHYSICS. (3)
Three lectures a week. Prerequisites: One year biology, a year of physics, and at least one semester of calculus; or permission of the instructor. An introduction to the ideas and methods used in biophysics to analyze the functional components of cells and tissues as physical-chemical systems.

ZOOL 415. CELL DIFFERENTIATION. (3)
Three lectures per week. Prerequisites: A course in embryology, cell biology, or genetic systems, or permission of the instructor. A discussion of cellular and subcellular differentiation, emphasizing the biochemical and ultrastructural bases of these development changes.

ZOOL 421. VERTEBRATE PHYSIOLOGY. (4)
Three lectures and one three-hour laboratory period a week. Prerequisites: One year of zoology and one semester of organic chemistry. An intensive study of nerve, muscle, sensory receptors and the central nervous system.

ZOOL 422. VERTEBRATE PHYSIOLOGY. (4)
Three lectures and one three-hour laboratory period a week. Prerequisites: one year of zoology and one semester of organic chemistry. An intensive study of the cardiovascular, gastrointestinal, renal and respiratory systems, and an introduction to endrocrinology, basal metabolism and reproductive physiology.

ZOOL 426. GENERAL ENDOCRINOLOGY. (3)
Three lectures each week. Prerequisites: One year of zoology and one semester of organic chemistry. The study of the functions and the functioning of the endocrine organs of animals, with special reference to the vertebrates.

ZOOL 430. VERTEBRATE EMBRYOLOGY. (4)
Two lectures and two three-hour laboratory periods a week. Prerequisite: One year of zoology. Principles of developmental dynamics including organization, differentiation, morphogenesis, and developmental physiology.

ZOOL 440. EVOLUTION. (3)
Three lectures per week. Prerequisite: A course in genetics or permission of instructor. A consideration of current thought in regard to the origin and evolution of living organisms.

ZOOL 446. MOLECULAR GENETICS. (3)
Three lectures per week. Prerequisites: A course in genetics and one year of organic chemistry. The molecular basis of gene structure and function. Regulation of differential gene expression.

ZOOL 447. EXPERIMENTAL GENETICS. (4)
Two lectures and two three-hour laboratory periods a week. Prerequisites: two courses in genetics, one of which included laboratory work, and permission of instructor. A methodology and techniques course considering experimental design, the use of diverse interpretation of data.

ZOOL 456. ZOOGEOGRAPHY. (3)
Three lectures a week. Prerequisites: ZOOL 101, 102, and 290 or equivalent. Principles governing the geographical distribution of animals, with particular emphasis on vertebrates.

ZOOL 460. ETHOLOGY. (3)
Three lectures per week. Prerequisite: a course in general zoology and a course (or current enrollment) in physiology. An introduction to the principles of animal behavior with emphasis on physiological basis, ecological correlates and evolutionary aspects of behavior.

ZOOL 461. ETHOLOGY LABORATORY. (3)
One lecture and two three-hour laboratory periods per week. Prerequisite or corequisite, ZOOL 460 or equivalent. Training in the description of behavior, methods of quantification and experimentation, and the mathematical treatment of behavioral data.

ZOOL 470. ADVANCED ANIMAL ECOLOGY. (2)
Two lectures per week. Prerequisites: one year of zoology, calculus, statistics. Designed for majors and graduate students in the biological sciences. Topics to include theory of population growth and regulation, life tables and population projection matrices, Niche theory, theory of competition and predation, diversity analysis, and energetic modelling. Emphasis will be on current literature and research in ecological theory.

ZOOL 471. LABORATORY AND FIELD ECOLOGY. (2)
One three-hour session for exercises, and one one-hour discussion. Prerequisites: ZOOL 470 previously or concurrently. Exercises in laboratory and field will pursue problems of contemporary ecological interest; population density regulation, community structure, Niche shape, competition coefficients, pattern diversity, and energetics of ecosystems. Topics will be coordinated with those presented in ZOOL 470. Terrestrial and aquatic systems will be studied.

ZOOL 472. PROTOZOOLOGY. (4)
Basic conceptual treatment of free-living and parasitic protozoan functional morphology, life history, and systematics. The laboratory will stress observations of protozoa, living and stained, collected from diverse habits. Two hours of lecture and six hours of laboratory including field trips. Prerequisite: one year of biology.

ZOOL 475. GENERAL PARASITOLOGY. (4)
Two lectures and two three-hour laboratory periods a week. Prerequisites: Two years of zoology and one year of chemistry, or permission of the instructor. A consideration of the phenomenon of parasitism through a study of the structure, function and host relationships of parasitic organisms.

ZOOL 480. HYDROBIOLOGY. (4)
Two lectures and two three-hour laboratory periods a week. Prerequisite: An introductory course in ecology and one semester of chemistry. An investigation of the causal relationships of fresh water, estuarine and marine biotic communities to their environments.

ZOOL 481. THE BIOLOGY OF MARINE AND ESTUARINE INVERTEBRATES. (4)
Two lectures and two three-hour laboratory periods a week. Prerequisite: One year of zoology. An in-depth consideration of the taxonomy and functional morphology of the invertebrates, exclusive of insects. Chesapeake Bay forms and the study of living material will be emphasized.

ZOOL 482. MARINE VERTEBRATE ZOOLOGY. (4)
Two lectures and two three-hour laboratory periods a week. Prerequisite: Two years of zoology or permission of the instructor. A consideration of the evolution, taxonomy, morphology, physiology, behavior and ecology of marine and estuarine protochordates and vertebrates.

ZOOL 483. VERTEBRATE ZOOLOGY. (4)
Two lectures and two two-hour laboratory periods a week. Prerequisite: One year of zoology or permission of instructor. The identification, classification, habits and behavior of vertebrates with emphasis on fresh water, terrestrial and aerial forms, and a consideration of the evolution of living and fossil representatives.

ZOOL 495. ANIMAL HISTOLOGY. (4)
Two lectures and two three-hour laboratory periods per week. Prerequisites: A course in general zoology and a course in vertebrate anatomy, or permission of the instructor. A study of the microscopic anatomy, ultrastructure and histophyslology of tissues and organs of vertebrates.

V
FACULTY

AARON, Henry J., Associate Professor of Economics
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Laurea, University of Milan, 1961.

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BECKMANN, Robert B., Dean and Professor College of Engineering
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BELCHER, Ralph L., Lecturer and Reactor Director, Nuclear Engineering
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Ph.D., Wayne State University, 1964.

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